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NORTHERN SENEGA.

By L. E. Sayre, University of Kansas.

The geographical distribution of senega has been a subject of a good deal of interest to the members of the pharmaceutical profession and the drug trade for a number of years. Chief among the contributors to our present knowledge of the drug in this particular have been Prof. J. M. Maisch and Prof. J. U. Lloyd, as will be seen by glancing over the back numbers of the American Journal of Pharmacy, the Proceedings of the American Pharmaceutical Association, and other pharmaceutical publications.

Reference has been made to senega growing in Wisconsin and Minnesota, but there has not been very definite information given, I believe, as to its collection or the exact district of country from which it is collected in these States. "Northern Senega" has been a current term meaning a variety of senega having certain physical characteristics very unlike the original Polygala Senega. Prof. Lloyd (Proc. Amer. Pharm. Asso., 1881), describing this variety—which he says is derived from the Northwest from the States of Wisconsin and Minnesota—says it is very large and fleshy, sometimes white, again rather dark brown, the knotty crown measuring often from two to three inches in diameter, even of the dried plant. The root just below the knotty head is (when dry) from the size of the little finger to that of the thumb of a man; six to ten inches in length and generally destitute of keel; not so contorted and branched as the "Southern" senega.

L. L. Dyche, Professor of Zoölogy and Taxidermy, of the University of Kansas, some months ago made an extensive hunting

tour in the Northwest, the main point of his operations being in that country lying near the Lake of the Woods. During this hunting expedition he had an excellent opportunity of studying the country, its products and its people. On his return he handed me a root which he thought might be of some interest to me. He said it was collected in very large quantities and seemed to be one of the staples of that country. The natives depending upon its collection as one of the means of subsistence, have made this quite an industry among them. There the squaws and the children dig the root while the "Braves" hunt the valuable fur-producing animals. Prof. Dyche says that he saw at the different trading posts in Marshall and Kittson Counties, in the storehouses, as much as a thousand pounds stacked up in one heap. At a little town, Rocksted, near Thief River Falls, the Indians come in from long tramps of forty miles or more and bring in the fur, skins and this snakeroot. Here they had an immense stock on hand. Since his return, Prof. Dyche has received a letter from a trader at Jadis, Kittson County, stating that he has on hand a thousand pounds bagged up, waiting for a fair market price.

The root referred to is undoubtedly a good sample of senega. In length it varies from 4 to 8 inches; in diameter from $\frac{1}{16}$ to $\frac{1}{2}$ inch. Surrounding the root is a dark scar-covered head, having a diameter of from $\frac{1}{4}$ to $\frac{1}{2}$ inch. This head in the case of younger roots is covered with immature pinkish leaf-covered stems. The characteristic keel of Southern senega is rarely present and the contour of the root is much less contorted. The color ranges from the light yellow of young roots to the dark brown of the older ones.

Near the head, prominent annulations are present. These continue with enlarging intervals of space for some distance down the root. Lengthwise the whole root is deeply wrinkled, while frequent warty enlargements occur. The branches are not numerous. In considerable quantities, the odor of gaultheria is quite prominent, as it is also in a cold aqueous infusion. The taste is very acrid.

Under the microscope the wood is found to be cylindrical, and the ingrowth of the inner bark on one side which produces the keel of the Southern variety is not apparent in a majority of cases. The wood is whitish, ligneous and occupies about $\frac{1}{3}$ of the diameter of the root.

A sample of the drug was handed to Mr. McClung, one of the

senior students, for the estimation of the polygalic acid. He used Quevenne's process, and obtained of the pure acid 3·5 per cent. Methyl salicylate was abundant, as shown by the ferric chloride test.

It would seem from the above that this specimen handed to me by Prof. Dyche represented a good sample of senega; its quality, equal to the average root of the market.

I have planted some of the roots, which seem to be full of vigor, and hope to be able at some future time to classify the plant.

FALSE ANGUSTURA BARK.

By W. J. Smythe.

The substitution of the bark from a species of strychnos as well as other barks for the bark of the true angustura (Galipea Cusparia) has frequently occurred, and authorities have repeatedly called attention to it, but within the last few years apparently but little of it has been practised. This may be to some extent due to the fact that a number of our standard books of reference supply a description of the false barks as well as a number of chemical tests whereby the true bark may be distinguished from the others, thus making the sophistication comparatively easy to detect. None of the literature which I have been able to consult on this subject contained any reference to the percentage of alkaloid or alkaloids contained in the false (strychnos) bark. So that the results which I obtained from the assay of a specimen of the strychnos bark, which a short time ago was placed in my hands for assay under the supposition that it was a specimen of the true angustura bark, may prove of interest, especially as the percentage of the total alkaloids was so very high.

The specimen was in the form of a coarse powder of a brownish red appearance and devoid of the aromatic odor usually met with in the true angustura. The taste was intensely bitter and entirely different from that of the true bark. From the condition of the specimen botanical identification was of course out of the question. The very bitter taste at once suggested that the bark was of the false variety, and a few preliminary tests corroborated this. For the determination of the alkaloids, the following methods were employed:

(A) Five grams of the ground drug were macerated with 100 cc.

of a mixture of ether, chloroform, alcohol and concentrated ammonia (modified Prollius liquid) in a tightly closed bottle, and shaken vigorously at frequent intervals for 24 hrs. The mixture was then set aside until clear, when 50 cc. of the fluid representing 2·5 grams of the drug were drawn off by means of a pipette, transferred to an evaporating dish and the solvent completely expelled by gentle heat. The residue remaining in the dish was treated with a small quantity of 3 per cent. sulphuric acid, transferred to a small bottle and well washed with ether. A sufficient quantity of ammonia to make the solution distinctly alkaline was now added, and the liberated alkaloid taken up by successive portions of a mixture consisting of ether 3 parts and chloroform one part. The alkaloids were dried in the usual manner to a constant weight at a temperature of 105° C. The yield by this process was 6·4 per cent. total alkaloids.

(B) Five grams of the drug were placed in a Soxhlet extraction apparatus and exhausted with about 100 cc. of a mixture of chloroform, alcohol and ammonia. After complete exhaustion the solvent was expelled, and from this point the assay was carried on exactly as in the preceding process, the yield being 6·2 per cent. total alkaloids.

(C) Five grams of drug treated according to the method employed by Dragendorff for the estimation of the alkaloids in nux vomica (and which is so well known that I will omit giving the details here), gave me 5·76 per cent. of total alkaloids.

The results from these processes were very satisfactory, the mean indicating over 6·1 per cent. of total alkaloids.

An examination of the alkaloidal principle obtained from the above assays was next undertaken in order to prove the presence of brucine and if possible strychnine. Tests for brucine were applied as follows:

Nitric acid:—A few milligrams treated with concentrated nitric acid, at once gave the characteristic blood-red color.

Nitric acid and stannous chloride:—Another portion, treated with concentrated nitric acid, heated until the blood-red color had disappeared and the mixture had assumed an orange-yellow color; then cooled, diluting with a small volume of distilled water, and adding a drop of a freshly prepared solution of stannous chloride, at once produced the violet coloration which disappeared again on the addition of an excess of the reagent.

A number of other tests were also made, the results of which proved beyond doubt the presence of brucine.

The presence of strychnine as one of the constituents of the false bark, has been overlooked by some of the authorities on this subject, but W. A. Shenstone (in a paper read before the British Pharmaceutical Society, Dec. 5, 1877),[1] reports that he had succeeded in finding a small quantity of strychnine together with brucine in a specimen which he examined. Therefore, the alkaloids, obtained from the assays of the bark were very carefully examined for strychnine. In this case, the presence of such a large proportion of brucine rendered the reaction between sulphuric acid and potassium bichromate inapplicable, therefore I first employed the method recommended by Messrs. Dunstan and Short for the quantitative separation of strychnine and brucine,[2] which consists of precipitating the strychnine from an acid solution of the mixed alkaloids by means of potassium ferrocyanide (the brucine ferrocyanide remaining in solution), the subsequent decomposition of the strychnine salt by means of ammonium hydrate, and finally washing out the liberated alkaloid with chloroform. Two experiments were tried by this method as follows:

(1) 0·160 gram alkaloidal matter, treated according to the above process, after standing a few hours, deposited a very small quantity of a light brown resinous-looking precipitate which was decomposed by ammonia and exhausted with chloroform; on the evaporation of the chloroform, the residue failed to respond to the tests with potassium bichromate and sulphuric acid, but with nitric acid gave evidence of consisting largely or entirely of brucine.

(2) 0·243 gram treated in a like manner, with the exception that it was given a longer time in which to precipitate, gave the same result.

Failing to obtain any evidence of strychnine by the above method, a fresh portion of the specimen was exhausted in a manner similar to that employed by Mr. Shenstone in his examination, and the alkaloids obtained treated according to the manner adopted by him in his examination of brucine for the presence of strychnine, which I will quote as briefly as possible:

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[1] Pharmaceutical Journal and Transactions, Dec. 8, 1877, p. 445.

[2] Year Book of Pharmacy, 1883, p. 469.

About 0·120 grams of the alkaloids treated with 3 cc. of dilute nitric acid in a small test tube and heated gradually by immersion in hot water. After effervescence had ceased and the yellow crystals of cacotheline had made their appearance, an excess of solution of potassium hydrate was added and the mixture cooled. The alkaline solution was then exhausted by means of chloroform. The chloroformic solution was evaporated to dryness, and the light yellowish residue treated with sulphuric acid and potassium bichromate at once gave the reaction for strychnine, clear and distinct.

Another experiment with a small quantity of the alkaloids also gave conclusive results. Owing to the limited quantity of material at my disposal, I was unable to make a quantitative determination of the strychnine, but the results of the application of the above method were sufficient to prove that the percentage is exceedingly small, and would probably have very little influence on the medicinal properties of the drug.

Steps have been taken to procure a fresh supply of the drug, if possible, which I hope to receive in the near future, when I intend to make a complete analysis of it.

DETROIT, MICH., February 12, 1892.

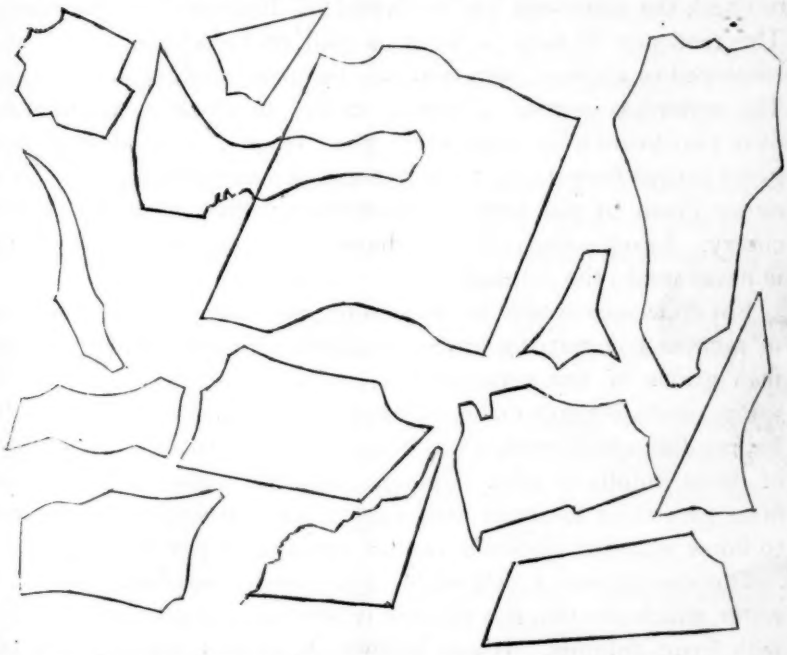
ON THE CRYSTALLINE FORM OF HYOSCYAMINE GOLD CHLORIDE.

BY J. B. NAGELVOORT.

Two years ago (see Amer. Jour. Phar., 1890, p. 118) the writer recorded his observation on commercial atropine sulphate which was found to be hyoscyamine sulphate, and attention was drawn to the shape of the crystals of its gold chloride, being very different from that of atropine gold chloride, as figured by Prof. Wormley in his Microchemistry of Poisons, where, however, the hyoscyamine double salt is not figured.

The crystalline forms of the two salts seem to me to be less liable to be confounded, and more easily observed than some of the chemical requirements, like the pleasant odor developed on heating atropine under the conditions described by the Pharmacopœia. This test recommended by Professor Flückiger was stated by the late Prof. van der Burg (one of the authors of the Dutch Pharmacopœia) to be "not always a success."

For these considerations it seemed to be desirable to preserve drawings of the crystals of hyoscyamine gold chloride (magnified 100 diameters), as obtained by following the directions of the pharmacopœia. These forms are, certainly, just as characteristic as the melting point, which the Pharmacopœia, perhaps wisely, has omitted. Determinations of the melting point are delicate operations, and I know of instances that physicians have mistaken the term "melting"



for "dissolving." Very slight contaminations (they could scarcely be called impurities) with atropine lower the melting point of hyoscyamine gold chloride quite perceptibly. The writer has observed 155°, 152°, 153° C. While such variations for the reasons stated are, most likely, of no consequence to the ophthalmologist, they would not tend to insure in the pharmacist a feeling of absolute reliability in these mydriatic preparations.

Aristol was applied locally in certain cases of cancer, by Dr. E. Arcoleo (*Rif. Med.*, Oct. 1891); it relieves pain, arrests bleeding, lessens the discharge, corrects the offensive odor, and not being absorbed, has no toxic action.

Snuff for hay fever—Boric acid 2·0 gm.; sodium salicylate 2·5 gm.; cocaine hydrochloride 0·12 gm.—*Quar. Ther. Rev.*, Jan., 1892.

NOTE ON CODEINE SULPHATE.

By Joseph W. England, Ph.G.

Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, Feb. 16.

Codeine sulphate is now meeting with strong medical favor as an extremely prompt sedative in affections of the respiratory tract. It possesses an advantage over morphine salts in that it does not seem to check the secretions, and is devoid of disagreeable after-effects. The tendency to form a habit is said to be absent. It is also employed to alleviate pain, and can be continued for a long time. The writer has in mind a case of cancer, in which it was used for over two years with remarkably good results. The dose usually given ranges from $\frac{1}{8}$–$\frac{1}{4}$ to $\frac{1}{2}$ grain, and sometimes a grain. It is either given in pill form or in solution; often in syrup of wild cherry. In our experience, the alkaloid codeine, which is officinal, is never used; the sulphate is always called for.

For convenience sake in dispensing, we have used for a number of months a standard solution of codeine sulphate, made with sixteen grains of the compound to each fluidounce of water. In using a certain firm's make, we have several times noticed an insoluble residue, which residue was completely soluble upon the addition of dilute sulphuric acid. Codeine sulphate obtained from other firms gave clear solutions with water; hence it became of interest to know what the insoluble residue was and its percentage.

The residue was a yellowish-white powder, sparingly soluble in water, which solution was alkaline in reaction and evinced no change with ferric chloride. It was soluble in alcohol, ether, benzol and chloroform. Added to nitric acid (s. g. 1·200) it dissolved to a yellow liquid, which did not become red. The solution added to mercuric chloride gave no precipitate. Dissolved in sulphuric acid the residue gave, with a trace of ferric chloride and gentle warming, a deep blue color. The reactions showed that the residue was the alkaloid codeine, probably present in the codeine sulphate through excessive heat employed in concentration of the solution for crystallization. The amount was 7·7 per cent. The possible dangers resulting from using a salt supposed to be entirely soluble in water, and containing such a heavy percentage of free and practically insoluble alkaloid, are obvious. Other samples of this same make, in the past, have contained as high a percentage.

ANALYSES OF SOME INDIGENOUS DRUGS.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy, No. 105.

Phlox subulata.—Lee Steinan has examined the overground portion of this plant and found the air-dried drug to contain 4·57 per cent. of moisture and 16·76 per cent. of ash.

Petroleum ether extracted 0·01 per cent. of volatile oil, 0·26 per cent. of fat melting at 41° C., 0·10 per cent. of a crystalline principle soluble in hot absolute alcohol and in chloroform. This is probably identical with the hydrocarbon found in *Phlox Carolina*.[1]

Stronger ether extracted 0·92 per cent. of resin and chlorophyll from the drug.

Absolute alcohol extracted 2·20 per cent. of the drug and this extract was tested for alkaloids and glucosides with negative results. It appeared to be made up of resin with some decomposed chlorophyll.

With the aqueous solvents the usual plant constituents were found and there remained 30·77 per cent. of cellulose.

Myrica asplenifolia.—The overground portion of this plant has for a long time been used in domestic practice for "night sweats" and diarrhœa. Recently it has come into use to a certain extent by regular physicians and is prescribed in the form of fluid extract or syrup in cases of chronic diarrhœa.

Joseph H. Venn examined the drug which was collected near Philadelphia in October. The aromatic properties were found to reside in the resin, which, however did not lose anything corresponding to volatile oil at 110° C. nor was it found to contain any volatile aromatic acid.

The astringent property of the drug was found to be due to the tannin which was found to be present to the extent of 4·35 per cent. An additional quantity of the plant collected in January yielded 3·68 per cent. of tannin. This tannin was found to give a green color with salts of iron, and to yield some gallic acid by decomposition.

Gillenia trifoliata.—Frank W. White submitted this drug to a proximate analysis. His results point to the active principle being a glucoside which was obtained by agitating an aqueous solution of

[1] Am. Jour. Pharm., 1888, p. 321.

the alcoholic extract with chloroform. The following is a summary of the more important constituents estimated by him:

	Per Cent.
Tannin,	3·96
Fat,	0·60
Wax,	0·16
Resin,	1·88
Mucilage,	2·00
Lignin,	10·23
Incrusting matter,	17·43
Cellulose,	27·92
Moisture,	9·02
Ash,	13·28

COMMERCIAL RESIN OF SCAMMONY.

By Walter H. Umstead.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy, No. 104.

Read at the Pharmaceutical Meeting, February 16.

Inquiry among the wholesale drug dealers of Philadelphia, developed the fact that most of the scammony of this market comes from one importer. However, three specimens were secured, No. 1 from Dr. Squibb, and Nos. 2 and 3 from dealers in this city. No. 1 was of a light color with a yellowish green shade, a strong sweetish odor and almost tasteless, soluble in alcohol, ammonia water (1 part in 50) and oil of turpentine, and insoluble in benzol. No. 2 and No. 3 were of a yellowish brown color, with a strong leathery odor, almost tasteless, soluble in alcohol and ammonia water, partly soluble in oil of turpentine and insoluble in benzol.

The Pharmacopœia requires that resin of scammony shall be wholly soluble in ether; and that it dissolve in solution of potassa, the heated solution not to be precipitated by the addition of hydrochloric acid in excess. No. 1 fully complied with these requirements, but specimens Nos. 2 and 3 were not wholly soluble in ether; 5 per cent. of No. 2 and 12 per cent. of No. 3 were found to be insoluble. These last two specimens were soluble in solution of potassa, but on adding an excess of hydrochloric acid to the warm solution precipitation resulted. The insoluble portion of the last two specimens in ether would indicate the presence of jalap. Starch was also tested for, by adding some of the resin to hot water, cooling and adding a solution of iodine, but no evidence of such was obtained.

All the specimens were free from resin of guaiac, as was indicated by not obtaining a blue color when the alcoholic solution was added to the fresh-cut surface of a potato.

Resin or colophony was sought for by the addition of sulphuric acid, which should give a red color immediately on adding to the resin. There was no immediate change produced with No. 1, but with Nos. 2 and 3, the acid produced immediately a dark reddish-brown color. Negative tests were also obtained for calcium carbonate. The ash of specimen No. 1 was 0·8 per cent.; of No. 2, 0·6 per cent., and of No. 3, 0·6 per cent.

The conclusions from this investigation are that a resin of scammony may be obtained in this market which meets all the tests of the Pharmacopœia, but that the most of that used does not fully comply with the requirements of our national standard.

THE ACTION OF HYDROGEN PEROXIDE UPON METALLIC SALTS.

By Frank X. Moerk, Ph.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy. No. 103.

Read at the Pharmaceutical Meeting, February 16, 1892.

The prescription submitted at one of the recent Pharmaceutical Meetings, led me to make some experiments to ascertain the reaction taking place, and later to extend the investigation so as to embrace the above title. The prescription in question was as follows: Tr. Ferri chlorid., f℥ss (2 cc.); glycerin., f℥ij (8 cc.).; hydrogen. peroxid. f℥vi (24 cc.). The materials were mixed in a two-ounce bottle and then tightly stoppered with a perforated cork, through which was inserted a thermometer (this experiment was made after a preliminary experiment proved it to be entirely safe); there was noticed an immediate deepening of the color after mixing; starting with an initial temperature of 29° C., the heat developed was recorded at intervals, the thermometer indicating after 5 minutes 33° C., after 10 minutes, 39° C., after 15 min., 54° C., after 18 min., 64° C., and then the temperature decreased until after 75 minutes the initial temperature was again recorded; the color had changed to a light yellow; upon removing the stopper it was found that no pressure existed in the bottle, but that there was a pronounced odor of

aldehyde and acetic ether. Upon testing the character of the iron salt after the mixture cooled there was found to be present only ferric salt; should the test be made before the mixture cools, or, if, after having cooled, the mixture be warmed again, there will be produced a dark blue precipitate, which might be taken as an indication of ferrous salt (this behavior was explained by subsequent experiments; the hydrogen peroxide is not completely reduced unless a sufficient quantity of ferric chloride is present, in which case the undecomposed hydrogen peroxide, aided by heat, reduces the reagent used for the detection of the ferrous salt, potassium ferricyanide, to potassium ferrocyanide and this then gives a dark blue precipitate with the ferric salt present). If to a portion of the solution ammonia be added in excess, the precipitate collected upon a filter, washed several times with distilled water, redissolved in dilute hydrochloric acid and then tested with potassium ferricyanide only the brown coloration due to ferric salts is obtained. If the solution be kept for a few days and then examined by addition of ammonia, there will be produced a clear greenish solution which, upon standing, will show a brownish coloration upon the surface, and only after some time will there be produced a precipitate; this precipitate collected, washed, dissolved in dilute acid and tested with potassium ferricyanide will give a very decided dark-blue precipitate indicative of ferrous salt. The above method was used to remove the undecomposed H_2O_2 so that this could not interfere with the test. From these experiments it will be seen that the ferric salt is not immediately reduced to ferrous salt, and that the ultimate reduction is probably due to the reducing action of alcohol or aldehyde since tincture of iron, after standing some days, also gives a test for ferrous salt.

Further experiments proved that alcohol and glycerin, either alone or mixed, had no action upon the hydrogen peroxide, but that the tincture of iron with the hydrogen peroxide gave the same results as recorded; this clearly indicated that the ferric chloride and hydrogen peroxide were the reacting ingredients. Using the ferric chloride solution with hydrogen peroxide it was noticed that heat was also generated and that a considerable quantity of a gas was liberated which, by causing a spark on a taper to burst into flame, was proven to be oxygen. It now became a matter of interest and importance to determine the volume of liberated oxygen

for this purpose it was not convenient to measure the evolved gas but the more convenient plan was followed of allowing the gas to displace water and, after the cessation of the reaction, to measure the water displaced. Two wide-mouth bottles were arranged for this; one, a four-ounce bottle used as a generator was fitted with a singly perforated cork, through which passed a piece of glass tubing; the other, an eight-ounce bottle filled with the water to be displaced, was fitted with a doubly perforated cork containing two pieces of glass tubing (one of which by a short section of rubber tubing was connected with the generator; to the other was connected a piece of rubber tubing so that this reached to the bottom of an eight-ounce beaker). 24 cc. hydrogen peroxide were placed in the generator; one cc. solution of ferric chloride (U. S. P.) was measured into a one drachm homœopathic vial and this placed upright in the generator so that the two solutions could not mix; before corking the generator a little of the water from the 8 oz. bottle was allowed to run out through the rubber tubing so that the latter was completely filled with water; after corking and ascertaining that the connections were tight, the rubber tubing from the eight-ounce bottle was introduced into the dry beaker and then the ferric chloride solution and hydrogen peroxide allowed to mix by tilting the generator. The deepening in color is also noticeable in this case; after a few minutes gas bubbles are seen to escape and the mixture becomes warm (the heat developed in this reaction is, however, not so great as in the presence of alcohol); agitation favors the evolution of the gas and the reaction is then complete in from one to one and a half hours; after allowing to cool the displaced water measured 182 cc. The examination of the solution for iron salts gave the same results as in the case of the prescription. The changes taking place in the prescription are, therefore, as follows: The deepening of the color is due at least in part to the elevation of temperature (if the mixture after cooling be warmed again there will be produced a distinct deepening of the color), and the latter is due in part to the liberation of oxygen from the hydrogen peroxide caused by the decomposing action of ferric chloride (this salt, however, is not in any way changed), and in part to the oxidation of the alcohol to aldehyde and acetic acid by the nascent oxygen. The presence of alcohol in the tincture of iron, therefore, accounts for the difference in action between the tincture of iron and solution of iron upon hydrogen peroxide.

To ascertain the conditions under which the hydrogen peroxide is completely decomposed by ferric chloride, the following experiments were made. First the hydrogen peroxide was standardized. [Several methods have been proposed for the estimation of this compound:

(1) By the action of potassium permanganate and sulphuric acid; in this method the excess of permanganate can be estimated with oxalic acid or the liberated oxygen can be measured, one-half of which comes from the permanganate, the other half from the H_2O_2.

(2) By the action of bleaching powder; in this case the evolved oxygen is measured, one-half coming from the H_2O_2 according to the reaction, $CaOCl_2 + H_2O_2 = Ca\ Cl_2 + O_2 + H_2O$.

(3) By the liberation of iodine from potassium iodide and sulphuric acid and titrating this with sodium thiosulphate.] For my purpose it was more convenient to use the officinal solution of chlorinated soda; the reaction, besides being complete in a few minutes, is a cleanly one.

10 cc. solution of chlorinated soda were placed in the generator and 2·5 cc. H_2O_2 in the homœopathic vial; after connecting as described and allowing the two liquids to mix, 53 cc. water were displaced; using 15 cc. solution of chlorinated soda and 2·5 cc. H_2O_2, 55 cc. water were displaced; this estimation is based upon the equation: $NaClO + H_2O_2 = NaCl + H_2O + O_2$, from which it will be seen that one-half of the oxygen only comes from the H_2O_2, therefore 2·5 cc. H_2O_2 liberated 27·5 cc. oxygen, making the H_2O_2 used an eleven volume solution (the H_2O_2 was taken from a freshly-opened bottle labelled 15 volume). The 24 cc. used with the ferric chloride in the above-mentioned experiment should have liberated 264 cc. oxygen, but as only 182 cc. were liberated it shows the incompleteness of the reaction.

(1) 5 cc. H_2O_2 with 5 cc. $Fe_2\ Cl_6$ solution (5 per cent.) liberated 45 cc. oxygen.

(2) After the preceding reaction was complete, 5 cc. more H_2O_2 were added; 44 cc. oxygen were liberated.

(3) Upon the further addition of 5 cc. H_2O_2, only 35 cc. oxygen were evolved, showing the important fact that the more dilute the ferric chloride solution, the less oxygen is liberated.

(4) By adding solution of chlorinated soda to (3) oxygen was given off, but unfortunately the quantity added was not sufficient to com-

pletely decompose the remaining H_2O_2, so that this experiment cannot be stated quantitatively.

(5) 5 cc. H_2O_2 with 5 cc. Fe_2Cl_6 solution (5 per cent.) at a different time gave 45 cc. oxygen.

(6) 5 cc. H_2O_2 with 10 cc. Fe_2Cl_6 solution (5 per cent.) evolved 50 cc. oxygen.

(7) 5 cc. H_2O_2 with 5 cc. Fe_2Cl_6 solution (U. S. P.) evolved 55 cc. oxygen, showing in this case complete decomposition; this experiment does not prove the absolute quantity of ferric chloride (which must vary according to the strength of the H_2O_2) necessary for the complete decomposition of the 5 cc. H_2O_2, but proves the fact that the decomposition can be made complete under the proper conditions.

A large number of experiments were now made to ascertain the action of other salts upon hydrogen peroxide; these were not made quantitatively but simply carried out as test-tube experiments to determine if decomposition resulted.

Before giving these results the known reactions and behavior of H_2O_2 may be stated: When concentrated it is readily reduced by finely divided silver, gold and platinum without oxidizing these metals; selenium, chromium and arsenic are oxidized to form acids. In dilute solution it is reduced by the oxides of silver, gold, platinum and mercury; these oxides also being reduced to metal. In alkaline solutions manganous salts are oxidized to manganic oxide; in acid solutions peroxides are reduced to mon-oxides (MnO_2, $K_2Mn_2O_8$, PbO_2). Potassium ferricyanide is reduced to potassium ferrocyanide; metallic sulphides are oxidized to sulphates. Sulphurous acid is converted into sulphuric acid; HCl and HI are decomposed with liberation of chlorine and iodine respectively. Other reactions which are used as tests for hydrogen peroxide are: The addition of ether to an acidified solution of H_2O_2 followed by a few drops of dilute potassium chromate solution will, after agitation, impart to the ether a beautiful blue color (generally stated to be due to the formation of perchromic acid); uranium nitrate is said to be a better test than the chromate. Potassium iodide and starch slowly give the blue color of iodide of starch (ozone or chlorine cause an immediate blue color). If to the previous test a little ferrous sulphate be added, it forms the most delicate test for H_2O_2 (one part in twenty-five million parts can still be detected). With naphthylamine and sodium chloride a blue color is produced.

Titanic, molybdic, tungstic and vanadic acids in presence of H_2SO_4 give yellow or orange colored solutions. Thallous oxide becomes brown, due to formation of thallic oxide. Indigo solution is decolorized after addition of $FeSO_4$. Guaiac solutions become blue after the addition of $FeSO_4$ (distinction from ozone and chlorine).

Hydrogen peroxide has been proposed as a test for molybdenum, molybdates in acid solution becoming deep yellow (claimed to be due to the formation of a higher oxide). In quantitative analysis it is used in the oxidation of ferrous salts; in the separation of manganese from zinc, cobalt and nickel; of zinc from cobalt and nickel and in the determination of potassium permanganate, of bleaching powder, of potassium ferricyanide, of potassium chromate, of manganese dioxide, of lead dioxide.

Hydrogen peroxide, in alkaline solutions, speedily decomposes, and is more permanent in acid than in neutral solutions; all mineral salts excepting the alkaline chlorides, nitrates and sulphates, and mercuric chloride have a decomposing effect; the addition of alcohol, ether, phenol, thymol, menthol to nearly neutral solutions have a preservative effect. In a paper published by Dr. G. Kassner (abstracted in the Am. Journ. Pharm., 1889, 565) "the preparation of oxygen is described from potassium ferricyanide and hydrogen peroxide in the presence of potassium hydrate. The statement is there made that the reaction progresses only in alkaline solution, and that as soon as the potassium hydrate is used up in the formation of potassium ferrocyanide, according to the reaction:

$$H_2O_2 + K_6Fe_2(CN)_{12} + 2KOH = 2K_4F(CN)_6 + 2H_2O + O_2$$

the evolution of oxygen ceases, but that the liberation of oxygen will continue upon further addition of KOH as long as both H_2O_2 and $K_6Fe_2(CN)_{12}$ remain."

A brief abstract of a very recent article by W. Kwasnik, "The action of barium peroxide upon metallic salts," Arch. der Pharm., 1891, 573, may prove interesting for comparison: "This study was incited by the process of Dr. G. Kassner for making oxygen from barium peroxide and potassium ferricyanide: taken in molecular proportion and covered with water, these materials will give up oxygen in the cold, the ferricyanide being reduced to ferrocyanide according to the reaction:

$$BaO_2 + K_6Fe_2(CN)_{12} = K_6Ba(Fe(CN)_6)_2.$$

The barium peroxide was allowed to stand with water to form the hydrated peroxide which was found to be more energetic in its action.

With Fe_2Cl_6 oxygen was liberated but without the reduction of the ferric salt; tried under various conditions the same results were obtained. Salts of potassium, sodium, lithium, ammonium, barium, strontium and calcium have no action upon BaO_2; magnesium salts will very slowly reduce BaO_2, liberating oxygen; zinc and cadmium salts act better but still only moderately upon BaO_2; nickel and cobalt salts produce a rapid liberation of oxygen, the hydrates of the metals being precipitated. Ferric, chromium, aluminium and manganous salts react like ferric chloride in rapidly liberating the oxygen, so that if the mixtures be agitated, the reaction is complete in a few minutes, ferrous salts are first converted into ferric salts and then oxygen is liberated. Cupric salts liberate oxygen without reduction to cuprous salts. Mercuric, silver and gold salts, in presence of excess of BaO_2 liberate oxygen and are reduced to metal. Platinic chloride shows a different behavior dependent upon the form in which it is taken; if as H_2PtCl_6 (commercial solution of platinic chloride), oxygen will be liberated but no separation of the metal takes place; if $PtCl_4$ be taken (by removing the HCl by addition of $AgNO_3$) oxygen is also liberated but metallic platinum separates. In these several experiments it was noticed that any salt of the metal could be taken, no matter if soluble or insoluble (in the latter case heat had to be employed at times to start the reaction)."

In the following experiments aqueous solutions of the different salts were used; where acid solutions were used these will be mentioned especially.

The action of H_2O_2 upon *potassium ferricyanide*, owing to the difficulty described in testing for ferrous salt in presence of ferric salt, was first investigated: A freshly prepared solution (which with ferric chloride gave only a brown coloration indicating the absence of ferrous salt and of potassium ferrocyanide) was used; if to a little of this solution a single drop of H_2O_2 was added and this mixture immediately added to some of the ferric chloride, a greenish coloration was at once produced and after standing a few minutes a dark blue precipitate separated. This proves that H_2O_2 even in the cold may reduce potassium ferricyanide to potassium ferrocyanide

and this latter reagent then produces the precipitate with the ferric salt. If equal quantities of H_2O_2 and $K_8Fe_2(Cu)_{12}$ solution be allowed to stand, there will be noticed after a few minutes an evolution of oxygen, showing that the reduction takes place in *neutral* or even acid solution, as another experiment proved; upon the addition of an alkali or alkaline carbonate the decomposition is hastened, the solution taking the *yellow* color of potassium ferrocyanide; by allowing the reaction to proceed for some time the mixture becomes almost *colorless*, but will still give the tests for ferrocyanide after acidifying.

Potassium ferrocyanide with H_2O_2, also causes, in cold neutral solutions the evolution of oxygen; in alkaline solutions the reaction proceeds more rapidly and here again an almost colorless solution results. No explanation of the decolorization can as yet be given.

Ferrous sulphate, with a few drops of H_2O_2, becomes quite dark brown in color without evolution of oxygen; upon addition of more H_2O_2, oxygen is liberated and a precipitation of a basic salt takes place (this is soluble on addition of HCl). By precipitating a portion of this test with ammonia, collecting, washing, dissolving in HCl, and adding potassium ferricyanide, only ferric salt was found present. If to the mixture of ferrous sulphate and hydrogen peroxide a little alcohol be added, there will be developed after a time the aldehyde odor; in this respect there is perfect analogy between ferrous sulphate and ferric chloride). It may be mentioned here that the oxidation of ferrous salts appears to take place more readily in neutral or alkaline solution than in acid solution.

Magnesium sulphate, zinc sulphate, alum, cobaltous nitrate, nickel nitrate, mercuric chloride, copper sulphate, bismuth nitrate (in HCl) *cadmium nitrate, stannic chloride* (in HCl) and *arsenious oxide* gave no evolution of oxygen after standing as long as twenty-four hours. The addition of a few drops of NaOH liberated oxygen with only the following: Cobalt nitrate with separation of black cobaltic oxide; nickel nitrate with separation of green nickelous hydrate; mercuric chloride with only a few drops of NaOH causes but a slight effervescence and separation of oxychloride; if, however, sufficient NaOH is added to change the oxychloride into oxide, then the reaction is energetic, and the oxide is reduced to the metal; copper sulphate with separation of cupric oxide; bismuth nitrate, cadmium nitrate and stannic chloride with separation of the white hydrates; arsenious

oxide or acid with formation of arsenic acid. The addition of an excess of NaOH to these several salts caused in every case the liberation of oxygen, and it is to be noted that when a small quantity of NaOH caused the reaction, the addition of an excess notably hastened the same. It is doubtful if the salts only acting with the excess of NaOH really bring about the decomposition or if this is due to the alkali itself, as it was subsequently proven that the alkaline hydrates and carbonates caused the evolution of oxygen from the hydrogen peroxide.

Stannous chloride develops considerable heat due to the oxidation to stannic chloride; any excess of H_2O_2 then reacts with $SnCl_4$ as stated above.

Chrome-alum, *cerous chloride*, and *manganous sulphate*, after some time slowly liberate oxygen; the addition of alkali hastens the decomposition; with an excess of alkali, chromic hydrate is oxidized to chromic acid, cerous hydrate to yellow ceric oxide, manganous hydrate to dark brown manganic hydrate. If a little of the chromate solution, obtained as above, be covered with ether, then a drop of dilute sulphuric acid added and agitated, the ether will become beautifully blue in color, due to the formation and solution of perchromic acid. It is therefore possible to successively oxidize chromic salts to chromic and perchromic acids; on the other hand, a chromate in acid solution is reduced to a chromic salt.

Lead acetate forms after a few minutes a whitish turbidity, later a yellowish white precipitate separates and the liquid effervesces; the addition of a drop of NaOH causes a bright red precipitate and lively effervescence; upon agitation the color of the precipitate changes to pale yellow; if an excess of NaOH be added there is formed a heavy dark brown precipitate, which after standing becomes of a distinct red-brown color (due to formation of some lead dioxide).

Auric chloride liberates oxygen while metallic gold separates.

Platinic chloride (commercial solution) liberates oxygen, the solution remaining yellow in color and transparent; the addition of NaOH causes the oxygen to be liberated more rapidly, but also without precipitation. A mixture of platinic chloride and silver nitrate solutions will only slowly evolve oxygen from H_2O_2; but the addition of a few drops NaOH will cause immediate reaction with separation of metallic silver and platinum.

Silver nitrate with H_2O_2 forms a white precipitate insoluble in

nitric acid, soluble in ammonia, showing the presence of chlorides or of hydrochloric acid (the solution of H_2O_2 has a slight acid reaction). Only after standing for a number of hours will this turbid mixture show signs of decomposing H_2O_2, but the addition of a few drops NaOH will cause the speedy decomposition with separation of metallic silver. If the silver nitrate be added in excess and the silver chloride filtered off, the filtrate will not even after standing twenty-four hours show any signs of decomposition.

The experiments made in alkaline solution show that hydrogen peroxide under these conditions is decomposed like the barium peroxide. The experiments also show that a number of metallic salts will decompose H_2O_2 even in neutral or acid solution; it is therefore evident that in the prescribing and dispensing of H_2O_2 this ready decomposition of the compound must be remembered; also that it will not do to prescribe and dispense H_2O_2 in what may seem to be desirable combinations unless experiment proves the combination practicable.

The above behavior of silver nitrate and hydrogen peroxide caused an examination for foreign matter to be made in the latter, with the following results: 20 cc. (weighing 20·252 gm.) gave a precipitate of silver chloride, weighing 0·03443 gm., calculating this to officinal hydrochloric acid, it will equal 0·137 per cent.; 20 cc. evaporated upon a water-bath until only a few milligrams difference was noticed between two weighings, left a syrupy liquid weighing 0·143 gm. or about 0·7 per cent., giving with borax a green flame indicating glycerin; the taste of this residue somewhat reminded of the hypochlorites; the sweet taste of glycerin was not prominent but the sensation of warmth as given by the latter was recognizable. By treating the residue with baryta water, evaporating to dryness, extracting with ether-alcohol and again evaporating, a residue was obtained possessing the sweet taste of glycerin. Upon evaporating 20 cc. to dryness and heating, it was noticed that the fumes given off burnt with a green flame, indicating the presence of boric acid or a borate; after two days' heating the residue was still black, so that it was not possible to determine the ash in the H_2O_2, but the residue treated with a little water gave a flame test for sodium. The H_2O_2 had an acid reaction and evidently the addition of hydrochloric acid, boric acid or borax, and glycerin was for their preservative action.

PRACTICAL NOTES.

Abstracts from Theses.

Extractum Dicentræ Fluidum.—Chas. E. Hammerquist made a number of comparative experiments with the view of determining the best menstruum for fluid extract of Turkey corn. The one directed by the "National Formulary," viz: 3 vols. of alcohol and 1 of water, yields a good fluid extract in which, however, some precipitation takes place. If prepared with alcohol the fluid extract was lighter in color, and less bitter, but remained clear. Made with a menstruum of 4 vols. of alcohol and one of water, a clear fluid extract was also obtained, and proved to be satisfactory in all respects. Other menstrua gave less satisfactory results than the above.

Extractum Glycyrrhizæ Fluidum.—The disagreeable and unsightly preparation of the pharmacopœial preparation suggested to Albert G. Reizenstein, the desirability of changing the menstruum or the manipulation, or both, and the objection appears to have been removed by making one pint of the preparation as follows: Moisten the drug in No. 40 powder (16⅔ oz.) with 16 fluidounces of water, containing ½ fl. oz. of water of ammonia; pack moderately tight in a cylindrical glass percolator, and exhaust the drug by percolation with more of the same menstruum; heat the percolate and keep it boiling for about ten minutes, adding some water if it should become too thick; set aside to cool, then filter, and wash the mass on the filter with cold water, evaporate the filtrate to 12 fluidounces and add 4 fluidounces of alcohol. The fluid extract is very sweet and is destitute of the bitter aftertaste of the pharmacopœial preparation. The most troublesome part of the process is the manipulation of the precipitate produced on boiling, which appears to be albumen colored with glycyrrhizin to a slight extent, and which is liable to clog the pores of the filter.

Emulsio Olei Morrhuæ.—The following formula is suggested by Oliver Stout for preparing an emulsion containing 50 vol. per cent. of cod-liver oil: Triturate 1 oz. of glyconin with 2 oz. of cod-liver oil, gradually added, until emulsified; dissolve 60 grains of ammoniated glycyrrhizin in water, and add this solution gradually, followed by water, to the emulsion until four fluidounces are obtained. The glycyrrhizin masks the taste of the oil without any further addition. Hypophosphites may be added with the water.

Syrupus Benzoini.—Francis F. French considers the following to be the best process for preparing this syrup: Prepare a tincture from 2 drachms of benzoin with sufficient alcohol, evaporate to a small bulk; add talcum ʒij, also a little sugar, afterward 4 fl. oz. of water; filter and dissolve in the filtrate 6 oz. of sugar. (See also Am. Jour. Phar., 1891, p. 187)

After having made satisfactory syrups of benzoin by several formulas, Wm. E. Gosh comes to the conclusion that it is an unnecessary preparation, being not as pleasant as syrup of tolu, and not possessing any medicinal properties superior to those of the latter.

Suppositoria Glycerini.—For preparing suppositories containing 90 per cent. of glycerin Geo. W. Hackenberger recommends triturating 4 p. exsiccated sodium carbonate and 2 p. powdered castile soap with 90 p. glycerin, and heating over a water-bath until free from foam, then add 4 p. stearin, again heat until free from foam, strain and pour into moulds.

For 50 per cent. glycerin suppositories mix glycerin 250 p. and water 200 p.; triturate with powdered castile soap 20 p. and exsiccated sodium carbonate, . heat over a water-bath as stated before, add stearin 15 p., again heat and strain. The addition of soap is considered an improvement over other formulas. Formulas for glycerin suppositories made with soap were also published in Amer. Jour. Phar. 1888, p. 560, and 1889, p. 80.

ABSTRACTS FROM FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

Digitaleïn.—Schmiedeberg divides the active constituents of digitalis into two classes, one soluble and the other insoluble in water. He furthermore separated the soluble digitalin into two bodies, digitonin and digitaleïn, by means of absolute alcohol. J. Houdas (*Compt. rendus*, 1891, cxiii, 648) concludes that there is only one compound in the soluble digitalin, viz: digitaleïn. He endeavored to separate this body, according to Schmiedeberg, by treatment with absolute alcohol and precipitation with ether, but found that the crystals obtained from the solution were identical with the portion remaining undissolved. The most characteristic property of digitaleïn is that on adding to the aqueous solution an alcohol of the fatty series, a crystalline compound, consisting of the

alcohol and hydrated digitaleïn, is formed, the solubility of which is inversely to the molecular weight of the alcohol used. The body obtained with ethylic alcohol loses its alcohol and water at 110° C. (230° F.) Digitaleïn is slowly soluble in cold water, and rapidly so in hot water; this solution does not yield a crystalline product. At 250° C. (482° F.) digitaleïn cakes together, at 270° C. (516° F.) decomposition begins, and at 280° C. (536° F.) caramelization is complete. The aqueous solution is precipitated by tannin and ammoniacal lead acetate. On careful treatment with dilute acids the author obtained from digitaleïn two other glucosides without the appearance of glucose.

Morphine and narcotine in opium.—Adrian (*Jour. Pharm. Chim.*, 1891, xxiv, 526) estimated the amounts of these two alkaloids in 38 samples of opium. The percentage of morphine varied from 6·75 per cent. to 12·15 per cent., in quite a number of cases being 8–9 per cent., the normal being about 10 per cent. Narcotine varied even more than morphine, the normal percentage being 2·5 per cent. One sample showed as high as 3·97 per cent., while two others showed 0·5 and 0·1 per cent., respectively. The sample with 0·1 per cent. of narcotine contained 10·075 per cent. of morphine, and the one with 3·97 per cent. of narcotine, 9·7 per cent. of morphine.

Antidote for morphine.—Kossa (*Monit. Pharm.*, Dec. 1891, p. 1007), through experiments with lower animals, finds that administration of picrotoxin and paraldehyde at the same time had the desired effect. The paraldehyde was given to counteract the contraction of the respiratory muscles produced by the picrotoxin. The latter alone does not act as an antidote in morphine poisoning.

Disinfectol is stated to be an energetic disinfectant, similar to lysol and creolin (see Am. Jour. Phar., 1890, p. 342; 1891, p. 93). It is a brown-black oily liquid, of an alkaline reaction, and of the spec. grav. 1·086, and besides hydrocarbons contains sodium carbolate and resin soaps.—*Jour. Méd., Chir., Phar.*, Nov., 1891.

Sulphaminol.—Wojtaszek (*Przeglad Lekarski* Aug. 8, 1891), experimented with this new antiseptic, sulphaminol or *thioxydiphenyldiamine*, proposed by Merck, but does not arrive at the same conclusions as this investigator. Hypodermic injections of 3 to 4 gm. to the kilo of the animal (rabbit), produced no effect, but like

foreign bodies became encapsuled after a few days. Exhibited by the mouth it is totally eliminated with the fæces. Antiseptic effects also could not be observed.

Exhibition of cod liver oil.—*Revue de Thérapeutique* (1891, p. 641) advises a mixture of equal parts of cod liver oil and lime water as a manner of exhibiting cod liver oil in a form which is borne by a delicate stomach. The mixture is milky, syrupy and inodorous; it does not develop a rancid and repugnant aftertaste. The assimilation is said to take place readily. For analogous combinations of the oil with alkalies or earths, see Amer. Jour. Phar., 1852, 172; 1856, 1; 1889, 517.

Purity of strontium salts.—Patein (*Revue Thérap.*, 1892, p. 13) proposes the following reaction for testing the purity of strontium salts, which are being used in cases of diabetes: (1) To a saturated solution of the salt two or three drops of a solution of bichromate of potassium are added. The solution should remain clear for at least 24 hours; 0·01 gm. BaCl in 10 cg. causes a precipitate. (2) To a very dilute solution of the salt two or three drops of neutral chromate of potassium are added; the liquid should remain clear for several minutes. For purifying the strontium salts the author proposes adding a few drops of dilute sulphuric acid (1–10) to a saturated solution of the salt to be purified.

Uses of strontium bromide.—In a discourse before the Academy of Medicine, Prof. Seé reported (*Progrès Méd.*, Oct. 31, 1891) that the diuretic properties of strontium salts observed by Dr. Laborde in the dog (see Amer. Jour. Phar., 1891, p. 129), were not observed in the human subject; but that he had seen notable improvement of the digestive disturbances in patients suffering from diseases of the heart and kidneys. In daily doses of 2 to 4 gm. administered at meal time, strontium bromide afforded decided relief in cases of dyspepsia, and the salt was also found useful in Bright's disease. At a meeting of the Biological Society, Dr. Fréré stated that strontium bromide, owing to its being well tolerated by the stomach, may be used in place of potassium bromide.

Strontium lactate may be made from lactic acid and strontium carbonate. Dr. C. Paul considers this salt to be of decided advantage in rheumatic parenchymatous nephritis, in scrofulous and gouty nephritis and in albuminuria of pregnant and puerperal women,

the secretion of albumin being rapidly decreased to one-half. *Progrès Méd.*, November 21, 1891.

Action of barium chloride.—Dr. Bardet reported to the Société de Thérapeutique (*Progrès Méd.*) the death of a woman from a dose of 4 grams of this salt. Barium chloride causes coagulation of the blood and this occasions embolism resulting in death.

Solution of bismuth chloride.—H. Causse (*Compt. rend.*, cxiii, 1891, 547) prepares a neutral solution of bismuth chloride by use of a saturated solution of sodium chloride. Contact with water decomposes bismuth chloride, but in the presence of free acid this decomposition does not take place. Ammonium chloride can be used instead of the free acid to prevent the decomposition of the bismuth salt; sodium chloride has the same effect. A solution of this kind can be used for preparing *basic bismuth salicylate*, the author's process being as follows: 35 gm. bismuth oxide are dissolved in 40 cc. concentrated hydrochloric acid and then mixed with 500 cc. of a saturated solution of sodium chloride. To this mixture is then added either bismuth carbonate or oxide, as much as will be dissolved, or a saturated solution of sodium chloride and carbonate in such quantity that the precipitate, which is at first dissolved, becomes permanent. To 500 cc. of a solution of sodium chloride are added 9 gm. sodium hydrate and 22 gm. sodium salicylate, the solution is filtered and then added to the first, when bismuth salicylate is precipitated. This is collected on a filter and washed with water acidified with a few drops of nitric acid until the filtrate is colorless. Bismuth salicylate forms microscopic crystals, which are decomposed by heat, and from which alcohol takes the acid.

Lead poisoning from wall-paper.—A case is reported by Dr. Guyot (*Jour. de Méd.*, Nov. 26, 1891) in which no other cause could be assigned for the plumbism, except the large proportion of lead compounds found in the wall-paper of the bed room.

Boric acid in vegetables.—A. Gassend reports (*Ann. agronom.*, xvii, 352) having found from 5 to 10 milligrams of boric acid per liter in a large number of South European wines. Treating the ash of 10 cc. of wine with alcohol and sulphuric acid, the green flame is not produced, but the boric acid is readily recognized by turmeric paper and by means of the spectroscope. Traces of this acid were also determined in grapes, apples, certain pears, potatoes, radishes and lettuce, but not in tea, saffron or cow's milk.

Oil of linden seed.—According to C. Mueller (*Ann. agronom.*, xvii, 431), the seeds of the European lindens (Tilia platyphylla, ulmifolia and intermedia) contain, besides little starch, about 58 per cent. of a yellow bland non-drying oil, which does not solidify at —21·5° C., does not become rancid, and resembles an excellent quality of olive oil. Sulphuric acid causes a dark brown red color, and a considerable rise of temperature.

Iodoform injection.—Dr. P. Thierry (*Semaine Méd.*) has found an injection composed of iodoform 10 gm. and expressed oil of almond 60 gm., useful in the acute stage of gonorrhœa. The injection should be retained for at least ten minutes.

Helenin is stated to be a valuable remedy in certain forms of leucorrhœa, being given in daily doses of 0 05 gm. Occasionally colic and diarrhœa are observed, but no other ill effects.—*Jour. de Méd.*

Commercial Peptones.—Van de Velde (Ann. Soc. méd. d'Anvers, Nov., 1891) examined three commercial peptones, viz: Cornelis, Kemmerich and Denaeyer's, the results being given in tabular form:

	Cornelis.	Kemmerich.	Denaeyer	
	gm.			
(A) Precipitated by alcohol,	35·886	47·567	68·9	Albumin, gelatin, albuminose and peptone.
(B) Soluble in alcohol, .	58·936	43·333	19·43	Extractive principles almost 20 per cent.; decomposition products of gelatin and albumin.
(C) Ash, ...	5·178	9·1	11·67	Incineration of A.
(D) Albumose and peptone.	15·121	peptone absent.	61·118	Determined with corrosive sublimate in the solution of A, (gelatin not being precipitated).

Naphthalin as a tænifuge.—Dr. Mirovitch (*Sem. Méd.*) gives naphthalin in the following mixture to children. Naphthalin 0·3–0·5 gm.; castor oil 15 gm.; oil of bergamot 11 drops. To be given fasting. Adults should take 1 gm. naphthalin and follow with 30

gm. castor oil. Two days before treatment, pickled, sour and spiced victuals should be taken.

Antipyrin in infantile diarrhœa.—Dr. Saint Philippe (*Jour. Méd. de Bordeaux*) uses solutions of antipyrin in cases of this kind. For children from 1 to 6 months, ½ per cent.; of one year 1 per cent., and of 2 or 3 years, 1½ per cent. solution of antipyrin are used, the dose being a coffee-spoonful every two hours.

GLEANINGS FROM THE GERMAN JOURNALS.

By Frank X. Moerk, Ph.G.

Exodyne, an American antipyretic, according to an analysis made by Dr. F. Goldmann, contains approximately 90 per cent. acetanilide, 5 per cent. sodium salicylate and 5 per cent. sodium bicarbonate; alkaloids could not be detected in this mixture.—*Pharm. Zeitung*, 1892, 39.

Quickine, an American antiseptic, contains one part carbolic acid and 0·02 parts mercuric chloride in 1,000 parts of a mixture of alcohol and water.—*Pharm. Zeitung*, 1892, 40.

The purification of resinified essential oils is best effected by neutralizing with sodium carbonate and distilling in a current of steam; the oil will be almost pure, but may have a yellowish color. To remove the color and to obtain the oil perfectly pure, it is placed in a flask with several pieces of stick potash, warmed to 50–60° C., allowed to stand over night and then distilled over a naked flame; bumping is prevented by adding a minute quantity of talc to the oil before distilling.—Dr. H. Werner, *Pharm. Zeitung*, 1892, 39.

Thymacetin is a compound related to thymol in the same manner as is phenacetin to phenol; it has the formula $C_6H_2(CH_3)(C_3H_7)(OC_2H_5)NHC_2H_3O$. It forms a white crystalline powder only slightly soluble in water; in doses of 0·25 to 1·0 gm., it generally relieved nervous headaches and occasionally acted as a hypnotic.—*Pharm. Zeitung*, 1892, 40.

Tests for fixed oils.—Dr. Holde states that of the numerous tests proposed for the identification of fixed oils in admixture, there is only one the reliability of which has not been questioned, namely, the test for sesame oil with hydrochloric acid and sugar (formation of a red color).—*Pharm. Zeitung*, 1892, 40.

The active principle of the Borragineæ.—The roots, stems, leaves and seeds of *Heliotropium europæum* and of *Cynoglossum officinale* were examined. By hot extraction of the *roots* with petroleum-ether there was extracted, especially from the cynoglossum, a red coloring principle, which by spectroscopic examination was proven to be identical with the coloring matter from alkanna. By extracting the residue with alcohol and evaporating, a mixture of wax and alkaloid was obtained; the latter was separated by treatment with dilute sulphuric acid and the solution supersaturated with ammonia yielded the alkaloid to chloroform. The roots after treatment with alcohol had lost all the bitter taste. The *stems* and *leaves* treated in the same manner failed to give indications of alkaloids. The *seeds* by the same treatment yielded the same alkaloid as the roots. The alkaloids extracted from the two plants are identical: it is hygroscopic; its salts are uncrystallizable and are readily decomposed at 100° C. and even at normal temperatures after some time. The alkaloid gives precipitates with the alkaloidal reagents; with concentrated sulphuric acid it becomes yellow, changing to a red; the addition of oxidizing agents does not produce characteristic colorations Physiological experiments did not show the curarine-like effects, as has been announced by other investigators. The name *cynoglossine* is proposed to be retained for the alkaloid, no matter from which source it is obtained.—Prof. F. Schlagdenhauffen and E. Reeb, *Pharm. Post*, 1892, 1.

The examination of urine for sugar frequently gives negative tests with Fehling's solution in the presence of sugar, because of the presence of interfering substances. Dr. G. Vulpius recommends the following method of applying the test: In two test tubes are placed 5 cc. diluted Fehling's solution and heated to the boiling point; to one of these is added one cc. of the urine, to the other one cc. of a mixture of equal volumes of urine and 1 per cent. glucose solution, and the tests again heated to the boiling point. Should neither test show indications of reduction it proves the presence of interfering substances, and other tests for sugar must be applied; if the test with the urine is negative while the one containing the glucose is positive, it indicates the absence of interfering substances and of sugar in the urine so that no further tests need be applied.—*Pharm. Post*, 1892, 7.

Antipyrine benzoate is prepared by adding antipyrine to a boiling solution of benzoic acid; it melts below the boiling point of water, forming a yellow liquid which solidifies to an opaque, crystalline mass; from alcoholic solution it is obtainable in small crystals. It is almost insoluble in hot or cold water, but is quite soluble in alcohol and ether; it has a faint odor of benzoic acid and possesses a pungent taste. *Antipyrine picrate* can be obtained in the same manner; it forms a pale yellow powder having the same solubilities but is not so fusible. Both give with ferric chloride a red coloration.—S. Cressati (*L'Orosi*) *Pharm. Post*, 1892, 93.

Hydrargyrum pyroboricum, $H_gB_4O_7$, is used to some extent in the treatment of sores; a two per cent. ointment with vaselin or lanolin as the base is the preparation generally prescribed; the salt is made by dissolving 76 gm. crystallized borax and 54 gm. mercuric chloride separately in 1,000 gm. distilled water; the solution of borax is added with constant stirring to the mercuric chloride solution, the brown precipitate formed rapidly settles and is thoroughly washed with water until the washings give no reaction with silver nitrate. It must be dried in the dark and then constitutes an amorphous brown powder, insoluble in water, alcohol or ether.—V. Tokayer, *Pharm. Post*, 1892, 156.

The alkaloids in extract of belladonna.—The experiments of Schütte and Siebert (Am. Journ. Pharm., 1891, 602), proving that the alkaloids present in the belladonna leaves consist chiefly of hyoscyamine, made it an interesting point to determine if this alkaloid during the manufacture of the extract changed to atropine, since it has been found that the change can take place by heating to 100° C. From 10 grams of an extract, kept for about eighteen months and prepared according to the Netherland Pharmacopœia, the crude alkaloids were prepared and fractionally precipitated with auric chloride; the precipitates were recrystallized from acidulated water and dried at 100° C. The first two fractions melted at 158·5° C., the third at 156·5° C., the fourth fraction was so small that the melting point could not be determined, but under the microscope it was found to consist largely of hyoscyamine-gold-chloride, while the atropine-gold-chloride could not certainly be identified. It follows, therefore, that the alkaloid present in the extract was almost entirely hyoscyamine and that no change had

taken place during the preparation of the extract.—L. van Itallie, *Apotheker Ztg.*, 1892, 27.

An antipyrine test.—If an antipyrine solution mixed with nitric acid be heated for some time there will develop a cherry-red coloration; the intensity of the color depends upon the concentration of the antipyrine solution and the strength of the nitric acid used.—L. Van Itallie, *Apotheker Ztg.*, 1892, 28.

A sensitive test for albumin in urine.—The reagent is made by dissolving 8·0 mercuric chloride, 4·0 tartaric acid, 20·0 sugar in 200·0 water; the acid is added to produce a strongly acid solution and the sugar to increase its density. In applying the test the urine is acidulated with a few drops of strong acetic acid, filtered and delivered by means of a pipette into a tube half-filled with the reagent so as to form two layers. If the urine contains even less albumen than 1 in 50,000, there is produced immediately or before the lapse of a minute, a distinct white ring at the line of contact; the white ring is especially seen if the tube be held against a black background.—Dr. E. Spiegler, *Oesterr. Ztschr. f. Pharm.*, 1892, 65.

Tannate of quinine.—DeVrij recommends the following method of preparation: One part pure quinine is intimately mixed by trituration with four parts tannic acid, ten parts water added, dried on a water-bath at a temperature not exceeding 60° C., the residue powdered and again dried. The preparation contains 20 per cent. quinine.—(*Ned. Tijds.*) *Oesterr. Ztschr. f. Pharm.*, 1892, 67.

A new method for preparing salol-phenyl salicylate.—Wierp and Ernert have recently noticed that if salicylic acid be heated to between 160–240° C., it forms salol by loss of water and carbon dioxide, if precautions are taken to remove the water as liberated and prevent access of air. The process has been patented. The salol is purified by washing with water, or, if necessary, with soda solution and then by crystallization from alcohol or other suitable solvent.—*Pharm. Centralhalle*, 1892, 27.

Antipyrine and euphorin, when triturated together liquefy or become pasty, depending upon the proportions; in prescriptions it has been found necessary to dispense the two separately or to enclose the one prescribed in smaller quantity in a small cachet and then to enclose this in a larger cachet with the other ingredient J. Mindes has noticed that if the euphorin be triturated with sugar

(which answers better if it be mixed with bicarbonate of soda or powdered liquorice), and this mixed with the antipyrine by using a spoon instead of a pestle, a powder is obtained that can readily be dispensed in a single cachet.—*Rundschau*, 1892, 3.

Aceta.—The observation made by Dieterich that in this class of preparations the percentage of acetic acid gradually decreases, is confirmed by M. C. Traub; accompanying this decrease of acetic acid is a change in the odor of the preparations, which is undoubtedly due to the formation of acetic ether.

Ethyl bromide.—An examination of an article made by the German Pharmacopœia process, proved that it contained an impurity which had a very irritating effect upon the nose and eyes before it was purified by treatment with sulphuric acid; by fractioning 100 kilos, there was obtained 500 grams of a difficultly volatile substance, which after purification yielded a fraction boiling at 150–151° C., and which was identified as *bromoform;* the very irritating substance was later isolated and found to be *mono-brom-acetone.* These impurities originate from an impure alcohol (*denaturized* by addition of pyridine) containing acetone, which latter is acted upon by bromine liberated from the hydrobromic acid employed. If the ethyl-bromide be very thoroughly purified by the action of sulphuric acid it can be kept for a long time, an occasional opening of the bottle not tending to decompose it; cork stoppers, however, should not be used, since this promotes decomposition.—*Schwz. Wochensch. f. Chem. u. Pharm.*, 1892, 3.

Sweetened castor oil is prepared by thoroughly washing with hot water, freshly expressed castor oil, and incorporating sufficient saccharin to give it a sweet taste; it is then flavored by adding small quantities of oil of cinnamon and extract of vanilla. The preparation is stated to keep very well and to be very agreeable in taste.—Standke, *Rundschau*, 1892, 111.

Nitro-jute.—In the manufacture of pyroxylin, cotton was primarily used; later, explosives were prepared by using wood and straw cellulose. Dr. O. Mühlhäuser recently experimented with jute and with good results. Taking 5 parts nitric acid and 10 parts sulphuric acid for one part jute, and keeping the temperature 15° C. during the whole operation, there is principally produced cellulose pentanitrate $C_{12}H_{15}O_5(O.NO_2)_5$. The product is insoluble in water, alco-

hol, ether, benzol; soluble in acetic ether and nitro-benzol; if only moistened with acetic ether there is produced a gelatinous mass; nitro-jute is partially soluble in ether-alcohol, a mixture of two parts ether and one part alcohol dissolving 11·93 per cent.; the residue is only slightly soluble in acetone. The most important difference between pyroxylin and nitro-jute is found in the action of alkalies and alkaline carbonates, nitro-jute being readily denitrated; to deprive the product of the acid retained after washing, a dilute (one per cent. or less) and cold solution of sodium carbonate gives the best results.—*Chemiker Ztg.*, 1892, 163.

Impurities of chloroform.—In the fractional distillation of a large quantity of chloroform (made by use of bleaching powder) it was possible to separate a small fraction boiling between 57 and 59° C., and having a specific gravity of 1·185; this is believed to consist of ethylidene-chloride along with some chloroform. Other impurities of the chloroform give rise to a blue or violet coloring matter upon agitation with sulphuric acid; also a principle developing a peppermint-like odor. It is possible by prolonged treatment with sulphuric acid to remove all of these impurities and obtain a chloroform which in no way is inferior to the chloroform of Pictet. An important matter is to decide between such pure chloroform and others of less purity; the results so far obtained warrant the following stringent sulphuric acid test: Equal volumes of chloroform and sulphuric acid (protected from light), agitated frequently during six to eight days should show no change in color; after the chloroform has evaporated spontaneously from the separated sulphuric acid layer, the acid diluted with five parts of water should not show any change upon the addition of 1 cc. $\frac{n}{10}$ silver nitrate solution. This test, it is needless to state, will only be complied with by a very pure chloroform. Another test which promises to be useful: 0·2 gm. metallic sodium and 5 cc. chloroform placed in a glass-stoppered cylinder, and warmed and agitated frequently during two or three days will give the following results; with a pure alcohol-free chloroform there is no change to be noted excepting that sodium chloride separates out in small white crystals. The presence of alcohol or other impurities causes a more energetic reaction and the salt separates with a yellow or brown color; a number of samples of chloroform which answered the requirements of the German Pharmacopœia yielded besides the colored separation of the salt, an

odor of carbylamine indicating contamination with some nitrogenous substance (to which may be ascribed the formation of the blue coloring matter upon treatment with sulphuric acid).—M. C. Traub, *Schwz. Wochensch. f. Chem. u. Pharm.*, 1892, 11.

OLEORESINS.

By George M. Beringer, Ph.G.

Read before the Philadelphia College of Pharmacy at the Pharmaceutical Meeting, Feb. 16.

Since the introduction of oleoresins, a number of pharmacists have essayed their preparation, seeking the use of some solvent less expensive or less dangerous to handle than ether. Benzin appears to have been the solvent suggested to most investigators. Prof. Wm. Procter (American Journal of Pharmacy, 1866, page 213) first recorded experiments with this solvent, and stated that in extracting cubebs he obtained 16·5 per cent. of extractive with benzin, against 21·9 per cent. using ether. As benzin dissolved cubebin but slightly, he did not consider it advisable to employ that solvent in the preparation of the oleoresin.

Prof. Procter early recognized the fact that the first portion of the percolate contained nearly the whole of the valuable constituents of the drug, and recommended the propriety of stopping the percolation before complete extraction and sacrificing the little oleoresin left in the dregs. Mr. H. N. Rittenhouse (American Journal of Pharmacy, 1867, 27), from experiments confirmed this observation of Prof. Procter, and recommended that the percolation with ether be stopped short of exhaustion, and that the last portions of the expensive menstruum should be forced out with benzin. As a result of these experiments, the U. S. Pharmacopœia of 1870 directed that the oleoresins of capsicum, cubebs, male-fern, lupulin and black pepper, be prepared by percolating 12 troy ounces of the powdered drug with *ether* until 24 fluidounces of percolate were obtained, the bulk of the ether to be recovered by distillation and the remaining portion to be evaporated on the water-bath. The oleoresin of ginger was, however, directed to be prepared by percolating 12 troy ounces of ginger, first with 12 fluidounces of *stronger ether*, and then continuing the percolation with alcohol until 12 fluidounces have been collected. The Pharmacopœia of 1880 ordered all of the officinal oleoresins to be prepared by percolating with *stronger*

ether until for every 100 parts of powdered drug used, 150 parts of percolate are obtained.

In 1872, Prof. J. M. Maisch (American Journal of Pharmacy, 1872, 208), published a review of the experiments of A. H. Bolton and Milton W. Roth. The former of these extracted capsicum, ginger and cubebs with benzin, and regarded the products as representing the drugs in question. The latter reported experiments with ginger and cubebs, from which it appeared that these powders, after extraction with benzin, yielded to ether some non-volatile matters. The benzin oleoresins were soluble in ether, but the ethereal yielded precipitate with benzin. These experiments proved, at least regarding cubebs, the deduction of Prof. Procter in 1866.

Prof. Henry Trimble, in a report to the Pennsylvania Pharmaceutical Association (see Proceedings of that Association, 1888) on commercial oleoresins, detailed a series of experiments on the use of benzin for this purpose. He concluded that while it was preferable to concentrated ether for the extraction of capsicum it would not answer for the other officinal oleoresins. The truth is most likely, *that as a result of more thorough investigations it will be found advisable to adopt different menstrua for the different drugs.*

The writer was led some two years or more ago, to experiment with benzin for this purpose, and came to the conclusion that its use was not admissible in the officinal oleoresins, with, possibly, the single exception of capsicum, pointed out by Prof. Trimble, and then only under certain restrictions which will be mentioned under that title.

About the same time it occurred to the writer that a substitute for ether might be found in acetone. The first experiments were tried with acetone procured from the distillers of wood products. Although guaranteed to be 85 per cent. acetone, it was found to consist largely of methyl alcohol, and even higher boiling fractions, and was found to be entirely unsuited for the purpose. Attempts to purify it by fractional distillation proved so unsatisfactory that its use was abandoned. Subsequently, I was enabled to procure some acetone as made by the manufacturers of chloroform by roasting acetate of calcium or barium, and the object of the present paper is to record some of the experiments tried therewith, to decide to what extent it might replace ether in the manufacture of oleoresins.

Acetone, as procured from this source, is a colorless liquid, having

a not unpleasant odor, and sp. gr. 0·800 to ·802 at 15° C. On evaporation it leaves no residue and distils over almost entirely between 55° and 60° C., and is nearly absolutely pure acetone. It is miscible with alcohol, ether and water, and can be easily distilled on the water-bath, boiling evenly and without that bumping that is usually so noticeable in wood products. It can be procured at a cost of 20 to 30 cts. a pound less than concentrated ether, and the loss in handling and distilling is considerably less than with the latter. As it possesses remarkable solvent power, being an excellent solvent for many of the alkaloids and neutral principles as well as for oils and resins, I predict that in the future it will be found a useful solvent in pharmacy and chemistry.

It was found that as with ether the first portion of the percolate contained nearly all the medicinal ingredients of the drug, so that it is unnecessary to continue the percolation after 2 cc. of percolate are obtained for each gramme of ground drug used. While in the experiments of the writer the percolation was continued until the drug was exhausted, in practice he would not advise the continuation of percolation further than that indicated, as the increased yield does not compensate for the loss of menstruum incurred.

In every instance the powders were dried after extraction with acetone, and these repercolated with concentrated ether, but with the possible exception of capsicum (which I believe, it is impossible to entirely exhaust, even with ether), nothing of value was yielded to that solvent. The resulting oleoresins were generally of excellent quality and the yield and characters were nearly the same as those obtained by the use of ether. The acetone as recovered by distillation from the percolates is contaminated somewhat by the odor of the drug, and is considerably weakened by the absorption of the moisture of the drug. It should be fractionated over fresh lime and is then suited for subsequent operations.

Oleoresina Aspidii.—The writer experienced considerable difficulty in obtaining male-fern fresh enough to use for this purpose, and was unable to collect any of our indigenous Aspidium marginale, *Swartz.* That used for the experiment was the imported rhizome of Aspidium Filix-mas, *Swartz*, and although the best that could be procured it was not as fresh as desired. The brown chaff and the stipes were *entirely* removed and only selected pieces of the peeled rhizome were used, and this will probably account for

the large yield obtained. By thorough exhaustion with acetone it yielded 18 per cent. of oleoresin of a brownish color, which soon deposited a resinous bulky sediment. It yielded a clear solution with ether, alcohol, chloroform and glacial acetic acid. Portions of the same rhizome extracted with concentrated ether by the officinal process yielded 16·18 per cent. of oleoresin. The increased yield with acetone is accounted for by the pectin and red-brown coloring matter which soon deposits. In the final evaporation of the last portions of the acetone on the water-bath, care must be taken not to heat the oleoresin too high or unnecessarily long or a gelatinization may result. A temperature of 70° to 80° C. is as high as there is any necessity to maintain.

Owing to the unsatisfactory quality of the drug experimented with, and the peculiarities of product just mentioned, the advisability of substituting acetone for the ether of the officinal process must be decided by additional experiments. While the writer has no doubt that acetone will thoroughly extract the drug, he hopes that others so situated as to collect the fresh aspidium will repeat the experiment.

The green-colored oleoresins of male-fern in the market are largely imported from Germany, where it is doubtless prepared from the green drug. It all deposits after keeping for a short time a bulky sediment consisting of resin and filicic acid. As this latter is now considered medicinally as valuable as the more fluid portion of the oleoresin, the Pharmacopœia adds a note directing that this be thoroughly mixed with the fluid portion before dispensing. Frequently, this is simply impossible, as it adheres firmly to the container and is the source of annoyance to the dispenser. It is the custom of most pharmacists to add sufficient ether to permit this admixture. Instead of this I would suggest the addition of a few drops of aqua ammoniæ, which will readily liquefy the sediment and furnish a uniform preparation, and is believed not to affect the medicinal value. The samples shown have been thus prepared and now furnish solutions with ether, alcohol and chloroform, which are not entirely clear.

Oleoresina Capsici—The yield of oleoresin from capsicum is stated in the accepted text-books as being 4 to 5 per cent. This statement most likely refers only to the more fluid portion, the fatty matters presuming to be separated, as directed by the Pharma-

copœia. This presumption is rarely, in practice, carried out. The manufacturers seeking a large yield obtain, by more thorough extraction with ether, 20 to 22 per cent. and separate but little of the fat. A sample of capsicum extracted with ether, by the U. S. P. process, yielded 17·32 per cent.; with acetone by percolating only until 2 cc. of percolate was obtained for every gramme of drug used, it yielded 18·00 per cent., and with purified benzin under similar conditions 21 per cent. By continuing the percolation until extraction was complete, the yield, with acetone and benzin, was increased to 25 per cent., but the resulting oleoresin was almost a solid, as the continued extraction seemed to largely increase the percentage of palmitin extracted. These oleoresins made with ether and acetone were both entirely soluble in benzin, it being the only oleoresin made with acetone, which was soluble in this solvent. They yielded, with alcohol, solutions which were not entirely clear. From these experiments it was concluded that either acetone, ether or benzin will extract capsicum, but the percolation should not be continued beyond obtaining 1·5 cc. of percolate for each gramme of the drug.

The slight solubility of palmitin in alcohol suggested that this oleoresin might also be prepared by the use of alcohol. Fifty grammes of the capsicum was percolated with alcohol and yielded 28 per cent. of extract. From this there separated a resinous and waxy sediment almost insoluble in ether. The liquid portion was extracted by mixing with an equal volume of ether, in which it was easily soluble and separated from the sediment by filtering through absorbent cotton. This yielded an oleoresin more liquid than those made with the other solvents and exceedingly hot, corresponding to nearly 14 per cent. of the drug.

Oleoresina Cubebæ.—Powdered cubebs thoroughly extracted with acetone yielded 25 per cent. of oleoresin. This was of excellent quality, fully representing the drug, and was not entirely soluble in benzin, but yielded clear solutions, and was readily soluble in ether, chloroform, alcohol and glacial acetic acid. After a time, it deposited some cubebin, the wax, however, separated out at once, being left in the still. Working on a larger scale since, the yield from two lots of cubebs have been 24·1 per cent. and 21·75 per cent., respectively, which agree with yields generally obtained by the use of ether.

Oleoresina Lupulini.—The yield of oleoresin from lupulin is variously stated as being from 50 to 70 per cent., and must neces-

sarily vary considerably. With selected lupulin, using concentrated ether, I have obtained 70·8 per cent. With acetone, by pushing the extraction to completion, I obtained 71 per cent. This latter of fine quality was but slightly soluble in benzin, but freely in ether, alcohol, chloroform and glacial acetic acid.

Oleoresina Piperis.—Ground black pepper yielded to acetone 9·97 per cent. The piperin soon separated and was removed by straining. The oleoresin obtained amounted to 5·93 per cent., and was similar to that obtained by the use of ether. It was but partly soluble in benzin, but entirely in alcohol, ether, chloroform and glacial acetic acid. By the use of ether, and working on a manufacturing scale, I have obtained a yield of from 5 to 6·7 per cent., but see no reason why acetone should not be substituted for ether in this preparation.

Oleoresina Zingiberis.—Powdered Jamaica ginger extracted with acetone yielded 5·57 per cent. of oleoresin of a fine quality, unsurpassed in aroma by that made with ether. The resinous portion was insoluble in benzin, but the oleoresin was entirely soluble in ether, alcohol, chloroform and glacial acetic acid. It appeared to be identical with that made with ether, and I would strongly recommend the use of acetone in this preparation.

Oleoresina Apii and *Apiol*—An examination of some commercial samples of apiol as recently made showed them to be largely oleoresins of parsley seed, varying in color from brown to a bright green, and exhibiting great difference in their density and action with solvents. None of them complied with the requirements of an apiol prepared, as originally proposed, by Joret and Homolle (American Journal of Pharmacy, 1863, 84), nor according to the process of L. Wolff (Ibid. 1877, 1). Freshly powdered parsley seed yielded to acetone 24 per cent. of oleoresin from which 3 per cent. of wax soon separated leaving, after straining, 21 per cent. of a bright green liquid oleoresin. This was entirely soluble in ether and chloroform, but about 10 per cent. of it of a resinous character was insoluble in benzin.

Purified benzin extracted 22·3 per cent. of oleo-resin entirely soluble in ether, chloroform and acetone. Both of these oleoresins compared favorably with most of the so-called "*apiols*" of the market, and for this purpose benzin appears to answer as well as ether or acetone. Upon treating these oleoresins with alcohol and subsequently evaporating this solvent, as suggested by L. Wolff (loc. cit.), about 4 per cent. of the weight of the seed was yielded.

INFANTS' FOOD.[1]

By Dr. Blackader.

Practically, all unite in regarding cow's milk, or some preparation of it, as the only serviceable substitute for human milk. There are certain difficulties in its preparation which must be clearly understood to be overcome.

(1) Cow's milk contains about double the amount of albuminoids that human milk does, while human milk contains a slightly larger amount of fats and sugars. Human milk is always alkaline, cow's milk usually acid.

(2) Cow's milk always contains microbes; frequently they are of the varieties which produce poisonous products.

(3) The supply of cow's milk being unlimited, we have not the same check upon the amount that we have when the infant is on the breast, hence we are apt to have added to the other difficulties that of over-feeding.

Either of these difficulties alone might defeat an attempt to nourish an infant with cow's milk; while operating together they render the problem in many cases very difficult. The author had hoped that with increasing knowledge of the composition of the two milks, and of the proper amount to be administered, together with sterilization, the problem of artificial feeding had been solved. While many cases yielded gratifying results, hopes in others were disappointed. Changes which milk undergoes in the sterilizing process may be epitomized as follows:

I. The starch liquefying ferment which exists in cow's milk in minute quantities is destroyed when the heat rises above 165° F.

II. A portion of the lactalbumen is coagulated.

III. The casein, after the action of prolonged heat, is less readily coagulated by rennet, and yields slowly and imperfectly to the action of pepsin and pancreatin.

IV. The fat globules are injuriously affected by the heat. The fat is free to some extent, and after standing, small lumps of butter are sometimes observed on the surface of the milk, while the portion not freed has a decidedly lessened tendency to coalesce. When sterilized and unsterilized milk are churned, it is found that the unsterilized yields more butter and in less time.

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[1] *Montreal Medical Journal;* Archives of Pediatrics, Jan., 1892, p. 67.

V. Milk sugar, by long-continued heating, is completely destroyed.

It would appear, therefore, that sterilized milk is less readily and less perfectly digestible than raw milk. Yet, it is to be preferred to raw milk swarming with bacteria. Under its use in the large cities the percentage of infant lives saved is increased and the percentage of summer diarrhœa is decreased. In the country or where fresh milk can be procured, the process of sterilizing is if possible to be avoided. The chief difficulty lies in securing the proper amount of heat. For ordinary purposes a temperature of 155° F. is sufficient, and the milk is not materially changed at that temperature.

In some instances the author believes that condensed milk may be substituted for a short time. It has the disadvantage of being deficient in fats—the cream being to a great extent removed by the process of condensing, to avoid rancidity in the prepared article.

Of the cereals used for infant food, barley, wheat and oatmeal are the most commonly employed. Of these, the author prefers barley. An excellent preparation is barley flour submitted to the action of heat of 212° F. for five or six days. It may be advantageously added to the milk for younger children, and in older children may form a fair proportion of the food.

A BACTERIUM WHICH FERMENTS STARCH AND PRODUCES AMYL ALCOHOL.[1]

By L. Perdrix.

The author has separated from Paris water a bacillus, *B. amylozymicus*, which ferments starch, with production of amyl alcohol. It is separated by cultivation on potatoes, and finally on gelatin. The bacillus is 2–3 μ long, and 0·5 μ thick; the rods are joined in pairs and chains, and in the absence of oxygen are motile, like *Vibrio butyricus*, Pasteur. The rods are readily stained; the spores are set free through the dissolution of the walls of the mother cell. The bacillus flourishes only in the absence of oxygen, readily, however, either in a vacuum or in hydrogen, nitrogen, or carbonic anhydride. The optimum temperature is 35°; it grows quite well at

[1] *Chem. Centr.*, 1891, ii, 252; from *Ann. Inst. Pasteur*, 1891, No. 5; reprinted from Jour. Chem. Soc., 1892, p. 90.

20–25°; at 16–17°, fermentation commences at the end of our days. Its "maximum" temperature is 42-43°. It will grow in all the usual cultivating media, ferments the sugars and starch, but does not attack cellulose or calcium lactate, differing in this respect from *Vibrio butyricus*, Pasteur. Acids are produced during the fermentations which it causes, and the presence of acidity, equivalent to 0·055 gram sulphuric anhydride, or of alkali equivalent to 0·08–0·11 gram in 100 cc., is sufficient to arrest the process; the addition of calcium carbonate to the liquid enables the fermentation to become perfect. Glucose ferments to hydrogen, carbonic anhydride, acetic and butyric acids during the first three days; from the third to the ninth day no acetic acid is formed. From saccharose and lactose, acetic acid is formed during the first five days. The greater the amount of oxygen present, the more acetic acid is produced; it was also observed that at the time of the butyric acid formation, all the cells contained spores. From the fermentation of starch a distillate was obtained, of which one-third was amyl alcohol, and from 100 grams of potatoes, 2·3–2·5 cc. of alcohols were separated. The sugar obtained from starch is very similar to glucose, but has a less rotatory action, and its phenylglucosazone melts 10° lower than that from glucose; 94 per cent. of the starch is converted into sugar, carbonic anhydride, ethyl and amyl alcohols, acetic and butyric acids, and 6 per cent. is converted into dextrin. The sugar formed by the bacillus from starch may be fermented perfectly with beer-yeast, either after sterilization, or in the presence of the bacillus. If either the sugar obtained by fermentation of starch with this bacillus, or a sterilized mash, be fermented with a pure cultivation of yeast, no fusel oil is formed, and the author concludes that the fusel oil found in commercially prepared alcohol, is formed by the action of bacteria. The *B. amylozymicus* remains uninjured for 10 days at 50–55°.

THE ANALYSIS OF PEPTONES.[1]

By C. W. Heaton and S. A. Vasey (Charing Cross Hospital).

It is well known that in the digestion of meat by acid pepsin several compounds are obtained, which, although similar in composition, are by no means identical in chemical properties or nutritive

[1] Read before the Society of Public Analysts; reprinted from the Analyst, 1892, p. 28–34.

value. Our knowledge of these compounds has of late been considerably extended, and various methods for their quantitative estimation have been devised. We have no new reagent to suggest; but after careful trial of all the processes at present in use, we have found that by a combination of several of them the analysis may be simplified.

The substances to be determined may, for analytical purposes, be classified as follows:

(1) Water; ash; total nitrogen.

(2) Matters extracted by absolute alcohol. Definite compounds for the most part; some nitrogenous, some non-nitrogenous. It has been shown by M. Denaeyer (*v. infra*) that one variety of gelatin present in peptones is soluble in alcohol.

(3) Albumins:—coagulated and rendered permanently insoluble by heat or by strong alcohol.

(4) Albumoses:—not coagulated by heat. Soluble in water. Precipitated by alcohol, cupric hydrate, phospho-tungstic acid, mercuric chloride and ammonium sulphate.

(5) Peptones:—not coagulated by heat. Soluble in water. Precipitated by alcohol, phospho-tungstic acid and mercuric chloride, but not by cupric hydrate or ammonium sulphate.

(6) Gelatins:—partly soluble in alcohol. Precipitated entirely and in all forms by phospho-tungstic acid and ammonium sulphate. Not precipitated by cupric hydrate or mercuric chloride.

It is well known that the nitrogen in proteids varies from 14·4 per cent. in chondrin to over 18 per cent. in gelatin. (*Beilstein*, iii, 1292–4.) Following previous workers, we have assumed 15·8 per cent. of nitrogen, which gives as the factor to be applied to the nitrogen 6·33. More exact knowledge is required before separate factors for each of the nitrogen determinations can safely be adopted.

The following is an abstract of the analytical methods described in recent researches from which our modified process has been derived:—

(1) A. Stutzer. (*Ber.* **13**, 251. *Ch. Soc. Absts.*, 1880, 676. *Cent. f. allg. Gesund. Pflege*, 1882, 179. *Ch. Soc. Absts.* 1882, 1239. ANALYST x. 57.) Meat preparations are digested with pepsin in the usual manner. In the undissolved residue nitrogen is determined by soda-lime. The fluid is then agitated with cupric hydrate,

suspended in weak glycerin, which, if the fluid be not too acid, throws down albumose. The separation appears to be complete, and the liquid filters well. In the cupric precipitate nitrogen is determined by soda-lime. The cupric mixture can be prepared as follows:—

100 grams of crystallized cupric sulphate are dissolved in 5 litres of water and 2·5 grams of glycerin added. The solution is then made alkaline with caustic soda, and filtered. The precipitate is well mixed with a large excess of water containing 5 grams of glycerin per litre. All traces of alkali are now completely removed by decantation, and, if necessary, by filtration, the same glycerin solution being used throughout. The precipitate is then made up to 1 litre with water containing 10 per cent. of glycerin. The thin emulsion then contains nearly 40 grammes per litre of cupric hydrate, and can easily be transferred by a pipette. It may conveniently be described as Stutzer's reagent.

(2) Kühne and Chittenden. (*Zeit. Biol.*, xxii, 409, 423. Amer. Jour. Phar. 1886, p. 568.) The substance previously known as peptone was found to contain bodies of two kinds, one of which (albumose) can be precipitated and washed by a saturated solution of ammonium sulphate, while the other (peptone) remains in solution. The filtrate is concentrated until crystals of ammonium sulphate separate and the remaining sulphate is then removed by barium carbonate and hydrate, the excess of barium being carefully precipitated by sulphuric acid. Methods for the estimation of albumose and peptone are described. They involve the use of phospho-tungstic acid.

The paper contains much valuable matter in regard to the nature, composition and reactions of peptones.

(3) König and Kisch. (*Zeit. Analy. Chem.*, xxviii, 191. Amer. Jour. Phar., 1889, 525). The peptonic fluid is boiled and filtered. In the residue nitrogen is determined by the Kjeldahl process, and this multiplied by 6·25 gives albumen.

The filtrate is divided into two portions. In one, albumose only —as it was then thought—is thrown down and washed by ammonium sulphate, as in the method of Kühne and Chittenden, but the precipitate is treated differently.

It is weighed, and the ammonium sulphate in it is afterwards estimated volumetrically by barium chloride and deducted, the

difference being taken as albumose. In the second portion both albumose and peptone are precipitated by phospho-tungstic acid. In the precipitate, nitrogen is estimated by the Kjeldahl process. Multiplying the nitrogen by 6·25, albumose and peptone are found, and so, of course, peptone by difference.

(4) A. Denaeyer. (*Bull. de l'Assoc. Belge des Chimistes*, March, 1890. ANALYST, June, 1890.) In this memoir it was shown that gelatin had been confounded with albumose in previous researches. Gelatin in all forms is precipitated by ammonium sulphate, so that the albumose found by the methods of Kühne and Chittenden, and König and Kisch was really a mixture of albumose and gelatin. If albumin and albumose are previously separated, gelatin may be precipitated completely by ammonium sulphate. It is unnecessary to describe the analytical method founded on this important discovery, as it has been improved in a subsequent paper by the same author.

(5) A. Denaeyer. (*Bull. de l'Assoc. Belge de Chimistes*, December, 1890. ANALYST, May, 1891; see also Am. Jour. Pharm., 1891, p. 146.) This memoir, recently translated and published with an addendum by Straker and Sons, London, contains later results of M Denaeyer's work. The analytical method which is described—although it is based upon those which preceded it—shows a distinct advance. Our own process is but a modification, and, we think, an improvement upon it. M. Denaeyer's system may be summarized as follows:—

(*a*) The peptonic fluid is treated with strong alcohol. After standing for 24 hours the precipitate, which consists of albumin, albumose, coagulable gelatin and peptone, is washed with alcohol, dried and weighed. The solution is then divided into two portions, which are separately treated (*b* and *c*).

(*b*) One portion of the alcoholic solution is evaporated to dryness and extracted with warm water. Excess of saturated solution of ammonium sulphate is then added, and the mixture warmed. On cooling, the gelatin soluble in alcohol adheres to the basin, and may be washed slightly with ice-cold water, dried and weighed. It is then re-dissolved in warm water, and the ammonium sulphate in it estimated by barium chloride and deducted from the weighed gelatin.

(*c*) The second portion of the alcoholic solution is evaporated to

dryness, dried over phosphoric anhydride for 8 hours and weighed. This operation is difficult as the residue is very hygroscopic, and M. Denaeyer prefers to estimate the extractives approximately by difference.

The alcoholic precipitate is treated with warm water and filtered from albumin, which can be weighed in a tared filter. The solution is then divided into three portions.

(*d*) Of these, one is treated with excess of solution of phospho-tungstic acid.

This throws down albumose, gelatin and peptone. The precipitate is thrown on a tared Schleicher's filter, washed with dilute hydrochloric acid, dried and weighed. It is then burnt, and the proteids found by difference.

(*e*) Another portion of the aqueous solution of the alcoholic precipitate is treated with ammonium sulphate as in process (*b*).

The weight of the precipitate, after deducting the sulphate, gives albumose and gelatin.

(*f*) The third portion is accurately neutralized and treated with excess of saturated solution of mercuric chloride. This throws down albumose and peptone, but not gelatin. The precipitate is rejected. The filtrate is treated as before with ammonium sulphate, and the weight of gelatin insoluble in alcohol determined.[1]

True peptone is now, of course, found by difference.

This scheme for the analysis of peptones is certainly the best that has hitherto been devised, but it is liable to objection in one or two respects. The process which we have adopted, and in which that of Stutzer is incorporated, appears to us simpler and more satisfactory.

(6) A. Denaeyer. (*Jour. Pharm. Anvers*, November, 1891. ANALYST, December, 1891.)[2] This is an admirable process for a simple assay of genuine commercial peptones. 10 cc. of aqueous peptone, containing about 2 grams of dry matter, are treated with 100 cc. of strong alcohol. After standing for 24 hours the precipitate is washed with alcohol, dried and weighed. The alcoholic solution is also dried at 105° C. and weighed. M. Denaeyer

[1] In a subsequent note M. Denaeyer recommends the removal of excess of mercury by H_2S, and points out that the phospho-tungstic treatment may be avoided.

[2] Our paper was written before this note appeared.

holds that in a well-prepared peptone the alcohol extractive should not exceed 30 per cent., but we are inclined to think this too low an estimate. A large proportion indicates that leucine, tyrosine, and other products of metamorphosis are present. It is evident that this process is not intended to replace more exact methods of analysis. Its greatest defect is that, if gelatin had been added to the peptone, it would be precipitated by alcohol, and would, therefore, be weighed with the nutritive constituents.

THE MODIFIED PROCESS.

It is convenient to work with a tolerably concentrated solution. Any portion insoluble in warm, but not boiling water, may be removed by filtration, and treated separately for nitrogen, etc. If a jelly be under examination it must be liquefied by heat or by dilution. In the following synopsis a strength of about 20 per cent. of solid matter is assumed. It is obvious that in any such scheme of analysis the mineral salts must be included among the organic proximate constituents, for our knowledge does not yet permit us to assign to albumose, peptone, and the like, any definite proportion of mineral compounds. It is best to make separate estimations of water, ash and total nitrogen.

(1) *Water; ash; total nitrogen.*—Estimated as usual. About 3 grams for water and ash and about 1 gram for total nitrogen, by the Kjeldahl method, are convenient quantities.

(2) *Albumin; gelatin insoluble in alcohol (coagulable gelatin); albumose; peptone.*—40 grams of fluid peptone containing about 80 per cent. of water are dropped gradually into 300 cc. of nearly anhydrous alcohol, in a large weighed beaker and the mixture agitated by gentle centrifugal motion. After an hour or so the above-named compounds will have separated and can be washed with absolute alcohol by decantation. The alcoholic solution is preserved for further treatment and is hereafter alluded to as the *stock alcoholic solution.* The beaker, with its contents, is then dried to constant weight at 100° C.

(*a*) *Albumin.*—The weighed alcoholic precipitate is digested with warm water and washed on a tared filter. The residue, which has been rendered insoluble by the alcohol, is weighed as albumin.

The filtrate from albumin is diluted with water to 250 cc. This may be described as the *stock aqueous solution.*

(*b*) *Albumose and gelatin.*—25 cc. of stock aqueous solution are evaporated to a few cc., treated with saturated solution of ammonium sulphate, raised to nearly 100° and quickly cooled with centrifugal agitation. The ppt. is thrown on a tared filter, washed with ammonium sulphate, dried and weighed. In the ppt. the excess of ammonium sulphate is afterwards estimated gravimetrically by barium chloride and deducted.

(*c*) *Albumose.*—50 cc. of stock aqueous solution are raised to near 100° C. and are then treated with 30 cc. of Stutzer's reagent. The ppt. is washed in a filter with hot water, and the nitrogen contained in it estimated by the Kjeldahl method. 30 cc. H_2SO_4 and a globule of mercury give good results.

(*d*) *Gelatin.*—It is evident that from the results of the two last operations both gelatin and peptone may be found by difference, and our experiments convince us that a satisfactory assay may be obtained in this way. But a direct estimation of gelatin may be made as follows: The filtrate from the copper ppt. is concentrated to a few cc. in a beaker previously weighed with a glass rod; saturated solution of ammonium sulphate is then added, the mixture raised nearly to the boiling point, and then quickly cooled with centrifugal agitation. As M. Denaeyer has shown, the gelatin now separates and adheres to the sides and bottom of the beaker, particularly if touched from time to time with the rod. The gelatin may now be once washed rapidly with the ice-cold water, dried and weighed, and the ammonium sulphate retained in it estimated and deducted as before.

(3) With regard to the alcoholic extract which we have described as the stock alcoholic solution, we confirm M. Denaeyer's statement that the dried extract is too hygroscopic to permit any accurate inference to be drawn from its weight. It is better to adopt the following method, which is in substantial agreement with that recommended by M. Denaeyer. The stock alcoholic solution is made up to a definite volume, say to 500 cc. This is divided into fractions for separate treatment.

(*a*) *Gelatin soluble in alcohol.*—One fraction, say one-fifth, is evaporated to dryness, taken up with warm water and treated with ammonium sulphate in the manner already described.

(*b*) *Urea, etc.*—Another fraction, one-tenth, may be evaporated to dryness and treated with sodium hypobromite. But evidently

the nitrogen could not with any accuracy be calculated as urea.

(*c*) *Nitrogen.*—Another fraction, one-fifth, may be evaporated and treated by the Kjeldahl method for nitrogen. After deducting the nitrogen present as soluble gelatin, the residue multiplied by 3·12 gives the creatin-equivalent of crystallizable nitrogenous compounds.

(*d*) *Ash in alcohol extractive.*—Another fraction may be used for the determination of ash.

The following analysis of a sample of beef-peptone prepared by M. Denaeyer will serve to illustrate the system.

The peptone was a semi-solid jelly, liquefied by gentle heat. It was sterile and bright, and was free from bitterness. It tasted like beef-tea, and mixed easily with water.

I.

Organic matters,	15·59
Mineral matters,	2·43
Water,	81·98
	100·00

II.

Albumins coagulated by heat and alcohol,		0·12
Matters precipitated by alcohol :—		
Gelatin (direct weighing),	2·00	
Albumose (Am. sulphate ppt. *minus* gelatin),	5·06	
[N.B.] Albumose found by estimation of N. in Cu. ppt., ·79 × 6·33 = 5·00].		
Peptone (difference),	3·33	
Total (direct weighing),		10·39
Matters not precipitated by alcohol :		
Gelatin soluble in alcohol (direct weighing),	1·30	
Extractive, etc. (difference),	6·21	
Total,		7·51
Water,		81·98
		100.00

III.

Nitrogen (Kjeldahl) :	
Total,	2·67
In alcoholic ppt.,	1·38
In albumose,	·79
Liberated by NaBrO,	·22

A READY METHOD OF DISTINGUISHING BETWEEN ALPHA- AND BETA-NAPHTHOL.

By F. W. Richardson, F.C.S., etc.

Having occasion to test the contents of two bottles to ascertain which was alpha- and which beta-naphthol, I applied the methods of N. Yvon, described in the *Chemical News* (vol. lxiv., p. 321), but obtained very unsatisfactory results; indeed process (2), as might be expected, gave no result whatever.

Remembering that the difference between the azo-dyes "Orange I" and "Orange II" is entirely due to the fact that while for the preparation of the former dye α-naphthol is used, β-naphthol is required for the latter, I worked out the following process:

Dissolve about 5 cgm. of sulphanilic acid in a little water containing about 5 cc. of normal soda; add 5 cc. of normal sulphuric acid, and mix the solution with 2 cgm. of sodium nitrite dissolved in a few drops of water.

Dissolve a little (about 4 cgm.) of the naphthol by the aid of a few drops (0·5 cc.) of normal soda, and into this solution pour the diazotized sulphanilic acid. With α-naphthol the liquid becomes dark blood-red; with β-naphthol only a reddish-yellow color is produced; this difference is most marked when the dyes are salted out.

The α-naphthol dye becomes dark brown with dilute sulphuric acid, while the β-naphthol compound is quite unchanged: this last reaction is very distinctive.

The equations representing the changes which take place are as follows:

$$\underset{\text{Sulphanilic acid.}}{C_6H_4.H.SO_3.NH_2} + 2HCl + NaNO_2 = NaCl + 2H_2O +$$

$$+ \underset{\substack{\text{Diazobenzol-sulphonic acid}\\ \text{chloride.}}}{C_6H_4H.SO_3.N = N - Cl}.$$

$$C_6H_4.H.SO_3.N = N - Cl + 2NaHO + \underset{\text{Naphthol.}}{C_{10}H_7(HO)} = NaCl +$$

$$+ 2H_2O + C_6H_4\begin{cases} \underset{\substack{\text{Orange I or Orange II.}}}{N = N - C_{10}H_6(HO)\ (\alpha \text{ or } \beta)} \\ NaSO_3. \end{cases}$$

Sodiumnaphtholdiazobenzene-sulphonate.

—*Chem. News*, Jan. 8, 1892, p. 18.

THE VALUE OF THE UNOFFICIAL PARTS OF IPECACUANHA.

By David Hooper, Government Quinologist.

About two years ago Prof. Flückiger, of Strassburg, informed me in a letter that he had ascertained that the seeds of Ipecacuanha were devoid of alkaloid. He also suggested that the leaves, if procurable, should be examined for alkaloid. At that time the only materials available for such an investigation were some very young plants growing in the Teak plantation at Nilambur in the Malabar district, and the leaves were being used for propagating purposes, as it was shown by Lindsay some years ago that a leaf in suitable soil is capable of producing roots and buds. The Ipecacuanha plants at Nilambur are making satisfactory progress considering the slowness of their growth. They have a good soil of sandy loam with organic matter, and they have sufficient moisture and shade; the root growth is more vigorous than that of the stem, and thousands of plants will soon be ready for supplying the root to the local Medical Store department.

Last month I was able to obtain six plants of two and a half years of age for examination. The roots were plump and dark colored, the annulations were well-formed, and the length of the longer roots was eight inches. The stems were woody and wiry, decumbent, as long as the roots, grayish in color, knotted and marked with leaf scars on the upper part, very slightly branched, quadrangular and smooth. The leaves were few and rather crowded at the upper part of the stem, opposite, shortly stalked, stipules large, united at the base, where are several ovoid glands, persistent, adpressed to the stem, whitish (pink on young plants), about as long as the petiole, deeply cut into four subulate laciniæ, blade 2-4 inches long or more, oval, pointed at the apex, entire, wavy on the margin, thick, with a few hairs on the edge, dark green, glossy, and nearly smooth above; paler, somewhat pubescent and with prominent veins beneath.[1]

The description of the plants from Nilambur agrees with the description of the cultivated variety of *Cephaëlis Ipecacuanha*,

[1] The description of the leaves is after that in "Medicinal Plants." The figures of the leaves and root in that work are rather imperfect.

defined by the late Professor Balfour ("Pharmacographia," 2d ed., p. 370). The six plants when dried in the sun afforded:

	Grams.
Root	21
Stem	8
Leaves	4·8

These were reduced to fine powder, and a sample of each was examined separately, according to the same process. The powder was exhausted with warm alcohol, the percolate evaporated to dryness on a water bath, water added to the dried extract and acidulated with diluted sulphuric acid. After filtering and washing with water, the clear liquid was treated with some freshly prepared Mayer's solution, 1 cc. of which corresponds with 0·0189 gram of emetine, until a precipitate ceased to be formed. The results of this analysis were as follows:

Root contained	1·79	per cent.	of	alkaloid.	
Stems	"	1·13	"	"	"
Leaves	"	1·45	"	"	"

The alkaloid was examined qualitatively; that separated from the stems and leaves had the same appearance and characters as that from the root, and it was doubtless emetine. Herbaceous plants containing an alkaloid, almost invariably yield the same alkaloid in different parts of the plant, but in trees and shrubs different alkaloids often occupy different portions of the same plant. It is of interest to know that the leaves and stems of the true ipecacuanha contain a good proportion of emetine, but they are not likely to displace the root from its position in the Pharmacopœias and in commerce.—Phar. Jour. and Trans., Jan. 23, 1892, p. 591.

ALKALOID FROM CHRYSANTHEMUM FLOWERS.[1]

By F. Marino Zuco.

The author has previously extracted from chrysanthemum flowers a new cholesterol, a glucoside, and an alkaloid. (See Amer. Jour. Phar., 1890, p. 579). The latter is prepared in quantity by boiling about 10 kilos. of the flowers in distilled water (3 parts) for two or three hours, filtering through cloth, pressing the residue and treating it again in the same manner. The extracts are evaporated

[1] *Gazzetta* **21**, 516—554. Jour. Chem. Soc., 1892, p. 84.

down to 30 litres, treated with neutral lead acetate and basic acetate of lead, neutralized with soda, filtered, and the excess of lead removed by passing sulphuretted hydrogen. After filtration, the liquid is concentrated to about 2 litres, boiled for some time with dilute sulphuric acid, filtered, and again boiled until no more resinous matters are formed. The liquid is then decolorized with animal black and an excess of the double iodide of potassium and bismuth added, when a heavy, bright red, crystalline powder containing the whole of the alkaloid is deposited.

The pure alkaloid *chrysanthemine*, $C_{14}H_{28}N_2O_3$, is a colorless syrup which, when kept in a vacuum, partially crystallizes in tufts of silky needles, and may be heated without decomposition to 100°, but not beyond that temperature. It dissolves in water forming alkaline solutions which absorb carbonic anhydride from the air; it is also soluble in ethyl and methyl alcohols, but not in ether, chloroform, or benzene. Salts of chrysanthemine yield, with the double iodide of potassium and bismuth, orange-red, flocculent precipitates which become crystalline and bright red on agitation; with the double iodide of mercury and potassium, a yellowish-white precipitate; with the iodide of platinum and sodium, a brown precipitate; with auric trichloride, a yellow, crystalline precipitate which dissolves on heating and is re-deposited on cooling; no precipitate is formed with platinic chloride, picric acid, tannin, or mercuric chloride. The base is optically inactive and physiologically innocuous. Its salts are for the most part soluble in water and even deliquescent; the aurochloride and the double iodide of bismuth and chrysanthemine are insoluble. It is a bi-acid base, but in dilute solutions it behaves towards acids as if it were mon-acid. Both the *hydrochlorides* crystallize in small, colorless, deliquescent needles, very readily soluble in water and alcohol, but only moderately in hot water. The *aurochloride* and *platinochloride* are very soluble in water.

On heating chrysanthemine with an excess of methyl iodide for two days at 100°, two methyl groups are taken up, and it is partly converted into a new base in which both nitrogen atoms are combined with hydrogen. The two bases can be separated by taking advantage of the great difference in the solubility of their platinochlorides in water. The *platinochloride* of the new base, $C_{16}H_{32}N_2O_3,H_2PtCl_6$, crystallizes in small, orange-colored needles, dissolves very sparingly in water, but moderately in hot water slightly acidi-

fied with hydrochloric acid; it is insoluble in absolute alcohol. The *hydrochloride* is a deliquescent compound which crystallizes in a vacuum in tufts of small needles. It is freely soluble in water and in hot absolute alcohol. The free base is a syrupy liquid which becomes partially crystalline after being kept for a long time in a vacuum.

Oxychrysanthemine, $C_{14}H_{26}N_2O_4$, prepared by oxidizing chrysanthemine with sodium hypobromite, yields a double iodide with bismuth, crystallizing in orange-colored needles readily soluble in hot water. The alkaloid is a syrupy liquid which, if kept in a vacuum, is slowly converted into a very deliquescent, crystalline mass. It has an acid reaction, but combines with both acids and alkalies. Chrysanthemine strongly resists the action of oxidizing agents; on heating a sulphuric acid solution of the base with potassium dichromate and sulphuric acid, it is almost quantitatively converted into oxychrysanthemine; a solution of potassium permanganate, on the other hand, only partially converts it into oxychrysanthemine, carbonic anhydride, ammonia, and traces of trimethylamine being evolved, whilst a portion of the base is completely broken up. Oxychrysanthemine is completely disintegrated by a hot solution of potassium permanganate. Dilute solutions of alkalies have no action on chrysanthemine even after prolonged boiling: very concentrated solutions decompose it into trimethylamine, γ-hydroxybutyric acid, and hexahydropiperidinecarboxylic acid with evolution of hydrogen. If chrysanthemine is treated with a moderately concentrated solution of potash, the decomposition takes place more slowly and a small quantity of a product intermediate between chrysanthemine and hexahydropyridinecarboxylic acid is obtained. This compound yields an *aurochloride*, $C_{11}H_{21}O_4NAuCl_3$, crystallizing in tufts of reddish-yellow needles. Oxychrysanthemine is decomposed by very concentrated solutions of potash into hexahydropyridinecarboxylic and succinic acids, carbonic anhydride, trimethylamine and hydrogen. Fuming hydrochloric acid has no action on chrysanthemine even after prolonged heating; concentrated sulphuric acid merely resinifies a very small proportion on boiling.

A glacial acetic acid solution of chrysanthemine (1 mol.) dissolves iodine (10 atoms), and on distilling off the solvent in a vacuum, a brown oil is left which does not lose iodine on heating at 150°. Chrysanthemine may be boiled with water for days with-

out change; if, however, a solution of the base in an equal weight of water is fractionally distilled, water alone passes over until the temperature exceeds 150°; trimethylamine then begins to come off, and continues to do so until the temperature reaches 200°, when an oily product accompanies it. If the apparatus is now exhausted, the residue distils over between 200° and 230°, the distillate consisting of a mixture of aqueous solutions of hexahydropyridinecarboxylic acid, amyl glycol, dihydroxyamylpiperidine, trimethylamine and traces of pyridine bases.

ON THE FLORA OF NORTHERN OHIO.

By Edo Claassen.

It is certainly with an ardent desire that after the long winter peculiar to this part of the United States everybody living there greets the arrival of spring and the reawakening of Nature; many kinds of work interrupted by frost and rough weather are then recommenced, and in their leisure hours all, with hardly an exception, take their steps into the open air to breathe the delightful exhalation of spring vegetation, and return to their homes and to their work, strengthened and invigorated. Although, without doubt, everyone hails joyfully the opening of the buds and the appearance of leaves and blossoms, there seems to be one only whose heart in such a time beats louder and whose blood runs quicker through his veins; he thinks of the reappearance of the darlings and favorites which he has annually saluted on his travels over hills, through fields and forests. This one is the botanist! It is a well-known fact that he will then look at all his acquaintances with a happy face; but at the same time it surely cannot be denied that his affection does not belong so much to those who in former years have been his daily companions as to those other ones whom he has met now and then only, and of whom we may often say, that they have immigrated from countries far off, from places where there is a soil and a climate in which they always thrive well. Such a region is Northern Ohio, where, on account of the peculiar climate produced by the gigantic quantity of water of Lake Erie as well as by the manifoldness of soil, many plants can be met with which usually are indigenous to more southern parts of the United States or to the shore of the Atlantic Ocean. The slate rocks, the sand- and limestones of the counties east, south and west of Cleveland belong to the Devonic, the Carboniferous and the Silurian Systems; in olden times, they were gradually covered, especially in the valleys of the rivers and of the creeks as also on and near the lakeshore, by layers of sand and of clay, the products of the decomposition of the above rocks, furnishing often a soil favorable to the growth of peculiar plants. More interesting to the botanist even than these places are the innumerable lakes and ponds, of which some are situated in every neighboring county, surrounded by hills, and thereby entirely shut off from the brooks and rivers which carry the waters of Northern Ohio to Lake Erie. As in their water we find shells peculiar to them, so we meet in them and on their borders plants rarely seen elsewhere. It is therefore not astonishing if the

eager botanist turns his steps not less frequently to those than to the lake region. The railroad, or, if necessary, a steamer, will quickly carry him to all the above places, while the steamer only can be taken into consideration if he intends a visit to the islands in Lake Erie; for instance, to Kelley's or South Bass Island. Keeping these facts in mind, it may readily be seen that in consequence of the difference of soil and of climate (the climate of the islands, and of the lakeshore, and that of the more southern parts near and on the watershed of this State),[1] the flora of our part of Ohio should be manifold, as it is in reality. The flora of the different parts of our region of Ohio to be contemplated here may for an easy survey consequently be divided into (1) the flora of the islands; (2) that of the lakeshore and of the adjacent swamps; (3) that of the lakes and ponds, and (4) that of the hills and valleys, of which the flora of the islands seems to be the most interesting. There are many islands in Lake Erie, of which Kelley's and South Bass Islands are among the larger ones; both possess the same rocks as the other islands do, viz: Kelley's Island the corniferous limestone, South Bass Island the so-called waterlime, a limestone—or rather magnesian limestone rock, containing up to over 40 per cent. of magnesium carbonate. On these islands a new world of plants seems to have appeared to even the botanist who is familiar with all plants on the lakeshore. After hardly putting his feet on the shore of the last-named island, Dianthera americana, *Lin.*, a plant growing in water, greets him, and from the rocks the white, often reddish tinged flowers of Allium cernuum, *Roth*, nod at him. In rocky places often moistened by water there grows abundantly Lythrum alatum, *Pursh*, and near by the beautiful shrubby Hypericum Kalmianum, *Lin.*, as also Lobelia Kalmii, *Lin.*, and on the top of the rocks, the surface of the island, Astragalus canadensis, *Lin.*, and Smilacina stellata, *Desf.*; in the woods near by, however, Herb Robert, Geranium Robertianum, *Lin.*, is found in great quantity, and often Parietaria pennsylvanica, *Muhl.* Rhus canadensis, *Marsh.*, a shrub, several feet high, with red berries, containing much citric acid, grows here and there in flocks, while Juniperus virginiana, *Lin.*, sometimes in old remarkably crooked specimens, surprises by its abundance. In open places of the woods there occurs frequently Arenaria Michauxii, *Hooker f.*, more rarely Thaspium barbinode, *Nutt.*, and on one single rock on the shore is found Houstonia purpurea, var. longifolia, *Gray*. It would carry the botanist too far, if he would mention all the interesting species found here; the pretty Campanula rotundifolia, var. arctica, *Lange*, the large blue bells of which reflect in the water below the rocks, may, however, yet be cited, as also Viburnum acerifolium, *Lin.*, Steironema lanceolatum, *Gray*, and Chenopodium hybridum, *Lin.* Such a rich flora as South Bass Island possesses, was not given to Kelley's Island, which lacks greatly the forest and the huge rocks on the shore. Several of the above species, however, were also seen here. Of new plants the following only could be added to the list: Verbena angustifolia, *Mich.*, Taxus canadensis, *Willd.* (both in rocky places), Eriophorum lineatum, *Benth.* and *Hook.*, (on moist meadows), and Nelumbo lutea, *Pers.*, (in the water of a pondlike swamp), which last magnificent herb occurs in other parts of the district more

[1] As an illustration to, and a proof of, this difference, the fact may be stated here, that grapes can be grown in Northern Ohio to advantage only on the islands and within about five miles of the lakeshore, while in more southern parts the frost damages them or their fruit considerably.

abundantly than here. Although surrounded by water and thereby doubtless provided with a damp atmosphere, yet both these islands cannot boast of any ferns, if the few specimens of Polypodium vulgare, *Lin.*, seen on the highest rocky part of Kelly's Island, are excepted. On the low sandy parts of the islands the botanist meets many of the plants which usually occur also on the lakeshore and in the adjacent swamps.

After having at this point finished his expedition to the islands, he returns to the fields of his home; the steamer carries him over the greenish water of the lake in several hours' time and after a short rest (sometimes very necessary on account of the rough treatment of him by the waves), and after having well arranged all the specimens collected, he is prepared to explore the lakeshore and the swamps near it. The sandy (or clayey) shore of Lake Erie, over which, particularly in warmer weather, there often hovers an atmosphere more or less saturated with water, provides an habitation to many rare plants; for instance, to Cakile americana, *Nutt.*, Polanisia graveolens, *Raf.*, Euphorbia polygonifolia, *Lin.*, Strophostyles angulosa, *Ell.*, Triodia purpurea, *Hack.*, Cenchrus tribuloides, *Lin.*, Sporobolus cryptandrus, *Gray*, as apparently also to Bidens bipinnata, *Lin.*, which was seen in but one place on a stony slope, and to Gentiana crinita, *Froel.*, Calamagrostis longifolia, *Hook.*, Potentilla anserina, *Lin.* The swamp situated on and near the shore, mainly that of the Cuyahoga valley on Whisky Island, the gradual disappearance of which the botanist regrets very much, furnishes him (or did furnish within the last years) with Lysimachia thyrsiflora, *Lin.*, the splendid Hibiscus Moscheutos, *Lin.*, Eclipta alba, *Hassk.*, Phragmites communis, *Trin.*, Scirpus polyphyllus, *Vahl*, Proserpinaca palustris, *Lin.*, and Decodon verticillatus, *Ell.*, a shrub frequent in many swamps throughout the lake region. The presence of Pedicularis lanceolata, *Michx.*, and of Juncus Gerardi, *Loisel.* (2 tufts only), may be mentioned here. In parts further west (in Ottawa County) a great bog on L. S. R. R. near Gypsum awakened the botanist's interest by the presence there of Solidago Riddelii, *Frank*, Hypericum gymnanthum, *Engelm.* and *Gray*, Prenanthes racemosa, *Michx.*, and of the Lythrum of South Bass Island, L. alatum, *Pursh.* The fields between Gypsum and Port Clinton, although not of a swampy nature, but nevertheless under the influence of moisture, being bounded on the south by Sandusky Bay and on the north by Lake Erie, should also be considered here. Within half an hour's time the botanist could collect here: Euphorbia dentata, *Michx.*, Silphium terebinthinaceum, *Lin.*, Spartina cynosuroides, *Willd.*, Lophanthus nepetoides, *Benth.*, and Rudbeckia triloba, *Lin.*, with its yellow rays and dark purple disks. He has now reached the lakeshore; in sandy places he finds Panicum virgatum, *Lin.* Further east, however, a big swamp is situated, which the botanist can only partly penetrate. Millions of the common Scirpus pungens, *Vahl*, grow there, but also up to 5 feet high the Boltonia asteroides, *L' Her.*, with innumerable flowers. Tired as he is by his attempt to walk through the dense vegetation there, he leaves this place, turning his steps southward to the rich woods, where he meets Polymnia canadensis, *Lin.*, and the interesting Xanthoxylum americanum, *Mill.*; Sicyos angulatus, *Lin.*, covers these bushes and shrubs up to 20 feet high. Further northeast the woods lose their richness of soil, disappear then almost entirely, sand takes their place, the proper material for the growth of Gerardia purpurea, *Lin.*, and Triodia cuprea, *Jacq.*

Catawba Island has now been reached; the botanist did not recognize it, as a narrow road connects the same with the territory just left; moreover, in a dry summer no water can be seen in the lake arm. Rocks commence to appear, the biggest of which is Sugar Rock; from the top of it his eyes glide down to the shore; and he can stay there no longer; a magnificent specimen of Hibiscus Moscheutos, *Lin.*, with large light rose-colored flowers, calls him down. Near-by in fissures of the rock grows Liatris scariosa, *Willd.* (with handsome rose-purple flowers and corms or tuber-like roots); Solidago ulmifolia, *Muhl.*, and Lespedeza violacea, *Pers.*, soon appear. A big swamp then makes his heart rejoice, for it is full of Nelumbo lutea, *Pers.* Of course, he is now unable to go forward, he cannot pass without having pressed several specimens against his bosom, which the deep mud of the swamp, however, had almost prevented him from doing. Ottawa City, a beautifully situated small place, opposite Mouse and South Bass Islands, with a shore formed entirely of rocks is then reached; the botanist, after having secured fine specimens of Euphorbia commutata, *Engelm.*, closes his investigations here for the present time and returns on a road leading through orchards of peaches and pears to his starting point, Gypsum, and to the railroad which brings him home late in the evening.

After a recreation of several weeks, the botanist, finding that he has left in the vicinity of Catawba Island quite a territory unexplored, takes the cars to Sandusky, from which place a steamer will convey him to Lakeside, situated on a peninsula in Ottawa County. This place is a summer resort visited by many people in order to strengthen themselves or to regain their health. He has, however, neither motive nor time to stay; he immediately goes forward to the quarries and into the woods and fields to gather whatever he can find of plants new to him. The decomposition of the corniferous limestone furnishes here as on Kelley's Island the soil on which the vegetation lives. Very soon he discovers Symphoricarpus racemosus, *Michx.* (known by its snow-white berries in winter), as also Ceanothus ovatus, *Desf.*, Calamintha Nuttallii, *Gray*, Asclepias verticillata, *Lin.*, Acerates viridiflora, *Ell.*, Isanthus cœruleus, *Michx.*, Scutellaria parvula, *Michx.*, and Cercis canadensis, *Lin.*; even on the debris taken from quarries at the near-by Marblehead he finds the renowned medicinal plant, the horehound, Marrubium vulgare, *Lin.*, accompanied by the not less important catnip. He stays there over night and his absence from home having been limited to 2 days, takes the first steamer to Sandusky and there another to Cedar Point (in Erie County). This is a neck of land, a peninsula, several miles long, but very narrow and bounded by Lake Erie on one side and by Sandusky Bay on the other; it is, with the exception of a small area covered with woods (near its point and on the Bayside), nothing but drift-sand deposited there by the lake-waves. No sooner has the botanist put his feet on the shore than his astonished eyes meet several species of plants unknown to him. It takes him hardly a minute to decide which one to examine first; he walks up to the nearest at hand, accidentally the nicest one also: it is Tradescantia virginica, *Lin.*, and the other ones follow: Artemisia canadensis, *Michx.*, Potentilla supina, *Lin.*, Cyperus Schweinitzii, *Torr.*, and Carex Houghtonii, *Torr.* Stepping further up he finds Juncus balticus var. littoralis, *Engelm.*, Festuca tenella, *Willd.*, Glyceria nervata, *Trin.*, Sporobolus cryptandrus, *Gray*, Lithospermum hirtum, *Lehm.*, Habenaria fimbriata,

R. Br., Ammophila arundinacea, *Host.*, Salix longifolia, *Muhl.*, with very silky leaves, Silene antirrhina, *Lin.*, Arctostaphylos Uva-ursi, *Sprengel*, Potentilla arguta, *Pursh*, Panicum scoparium, *Lam.*, the introduced Panicum miliaceum, *Lin.*, Stipa spartea, *Trin.*, the porcupine grass (with twisted awns up to 6 inches long), and the most interesting of all, Opuntia Rafinesquii, *Engelm.* This yellow-flowered member of the cactus family, which until now was known to grow only at the Atlantic Ocean and near the Mississippi River, seems to be in its proper place here also, for it thrives luxuriously, forming groups up to 6 feet in diameter. Dissimilar from its relatives, inhabitants of a warmer climate, it lives in Northern Ohio where in winter time all life seems to be extinct by frost; evidently it is the mild climate of this track of land which allows this Opuntia to grow here and to survive the winter, while the nearly tropical heat prevailing in summer on these sand-fields is just the temperature which it likes and which suits it. Notwithstanding the interest which the botanist on seeing this peculiar plant, shows in the same, he approaches it slowly and prudently, knowing that, in consideration of the many short bristles and the long spines, a too strong contact with it would be felt painfully by him. After having secured several specimens, he cannot stay here longer, the whistle of the steamer reminds him to return home; he throws one more look at the sand-dunes on the lakeshore side at the Ammophila arundinacea and the deformed old red cedar growing on them, passes big specimens of Quercus imbricaria, *Michx.*, and boards the steamer soon after.

[*To be continued.*]

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, February 16, 1892.

On motion of Mr. Webb, Alonzo Robbins, Ph.M., was called to the Chair.

Minutes of the last meeting were read, and no corrections being required, they were approved.

A paper upon *commercial specimens of scammony* was read by Horace W. Umstead of the present senior class, who also exhibited specimens of the different lots examined.

It was asked by one of the members present whether the resins obtained were tested for the presence of podophyllin, as the tests mentioned would not discriminate between jalap resin and podophyllin.

A paper on *codeine sulphate* was read by Joseph W. England, Ph.G. Mr. Procter said that both the alkaloid and sulphate were largely used, and Mr. Beringer stated that the alkaloid was used largely in pills, and the sulphate in mixtures. The dose was inquired about and it was said to be given in doses of eighth, fourth and half-grains, while one manufacturing pharmacist was making one grain pills; generally the dose is stated as being about twice that of morphine.

A paper on *oleoresins*, by G. M. Beringer, Ph.G., was read, and many specimens of these preparations were exhibited by the author. Professor Maisch said that the quantity of fatty matter extracted from capsicum by the various menstrua depended very greatly upon the presence or previous removal of the seeds, the albumen of which contains notable quantities of fatty matter; he

thought, however, that the preparation would be hot enough even if it contained all the fat present in the seeds. Respecting the rhizome of male-fern, as prepared for the market in Europe, Prof. Maisch said that it was sometimes split longitudinally to facilitate its drying, and that this practice was objectionable on account of the exposure of a large surface to the oxidizing action of the air, the pale green color of the fresh rhizome being thus rapidly altered to brownish red.

A paper upon the reaction of *hydrogen peroxide upon metallic oxides*, was read by F. X. Moerk, Ph.G., and elicited much discussion.

Mr. McIntyre said that he had great satisfaction in listening to the reading of the paper, which had taught him that physicians when prescribing remedies new to them, and of which they knew but little, had better leave well enough alone and not mix things, which may produce results entirely undesired. Mr. Procter said the paper covered a very extensive field in a very thorough manner, so as to be a standard reference upon the subject.

Prof. Maisch exhibited a rhizome of *Maranta arundinacea*, sent to him from Bermuda, by Mr. G. H. Summers, of Philadelphia. This specimen was dug about the first of the year, and is not nearly as large as the "sticks," as they are called by the growers, usually are at the time of collection in April or May. Last year's crop in Bermuda amounted to 180,000 pounds, yielding about 12 per cent. of the fecula, of which only a small proportion is shipped to the United States, mostly to Baltimore, while the balance is sent to London. Larger quantities of maranta arrow-root are received in the United States from other localities. Prof. Maisch had also received from Mr. Summers from Jamaica and exhibited a branch with leaves and fruit of *Vanilla planifolia*, so-called from the remarkable flatness of the leaf. Another variety of vanilla was exhibited, the botanical name of which he was unable to ascertain; it differs in the size and character of the leaf and fruit, the latter being short and of a straight growth, while the officinal vanilla is curved at its base, forming a hook. In answer to a question he stated that cultivated vanilla bean is much finer in flavor and odor than the fruit of the wild-growing plant; these qualities are in part due to the manner of "curing" the bean; but climatic influence must also be admitted, as the same plant grown in the island of Bourbon is of a somewhat different flavor.

Mr. Beringer exhibited a specimen of the flowers of *Acacia Farnesiana*, a product of Florida, used in perfumery, under the name of *cassie*. Professor Maisch stated that last spring he saw the plant in several places in the Southern States, where it is grown for ornament.

Replying to several inquiries, Mr. England gave the following formulas:

Niemeyer's pills, used for dropsical affections:—Each pill contains one grain each of powdered digitalis, powdered squill and blue mass.

Phthisis Pills.—Each contains one-sixth of a grain of powdered opium, one grain powdered digitalis and one grain sulphate of quinine.

Anæmia pills.—Each pill contains two grains each of potassium carbonate and exsiccated sulphate of iron. These pills are very similar to Blaud's pills.

The subject of the prevention of the adulteration of food and drugs by the National Government, which was announced for discussion at this meeting, was postponed in consequence of the lateness of the hour, and a motion to adjourn was carried.

T. S. WIEGAND, *Registrar.*

EDITORIAL.

The Flückiger Memorial.—After a long period of activity as a teacher of pharmacy and pharmacognosy, Professor Flückiger is about to vacate his chair at the University of Strassburg, with the view of enjoying the well-merited rest. The hearty good wishes of hosts of pharmacists and scientists will follow him to his retirement. To give, in a measure, expression to the sense of obligation for his numerous contributions to science in general, and to pharmacy in particular, an international committee has been formed, representing nearly every country of Europe, as well as each of the remaining continents. This committee has issued an appeal which explains itself, and which we publish in full with the names of the members of the committee attached.

APPEAL.

At the end of this term Professor Flückiger, of Strassburg, gives up his university career in order to retire to private life in Switzerland, his native country. Since he first became University teacher in 1861, he has given to the whole pharmaceutical world such wealth of valuable work, and has been so indefatigable, both as teacher and investigator, that we deem it our duty to thank him in due form. For this reason a committee has been formed of the representatives of every nation to collect contributions that we may express our gratitude to this scholar who is so well-known in all places where the pharmaceutical, chemical and pharmacognostical sciences are studied.

In the first place we think of drawing up an address with the signatures of the donors; secondly, we think of collecting the photographs of friends and colleagues in all countries; then we want to have a "Flückiger Medal" struck, on the further destination of which Prof. Flückiger himself will have to determine; and lastly, we purpose—if means permit—to establish a "Flückiger Foundation."

The committee here named wish to bring this before as many as possible of those who are interested in the same branches of science, and who can estimate the worth of Flückiger's works.

Each of the members of the committee will be glad to receive contributions, which may also be sent directly to Professor Tschirch at Bern (Switzerland). Photographs, if possible in carte-de-visite (or cabinet form), should be sent to Prof. Tschirch.

We beg that the name of the donor be inclosed with the photograph or donation on a piece of white paper 50 millimetres broad.

THE FLUCKIGER COMMITTEE.

J. Attfield, Ph. D., M.A., F.R.S., F.I.C., F.C.S., Professor of Practical Chemistry to the Pharmaceutical Society of Great Britain, in London, W. C., 17 Bloomsbury Square.—Dr. *H. Beckurts*, Professor of Pharmaceutical Chemistry at the Technische Hochschule of Braunschweig.—Dr. *R. Böhm*, Professor of Pharmacology to the University of Leipzig.—Dr. *Chr. Brunnengräber*, Senator at Rostock.—Dr *L. A. Buchner*, Obermedizinalrath, Professor of Pharmacy to the University, and Mitglied der Akademie der Wissenschaften in München.—*M. Carteighe*, F.I.C., F.C.S., President of the Pharmaceutical Society of Great Britain in London, W., 180 New Bond Street.—*Alphonse De Candolle*, Membre de l'Institut in Geneva.—Dr. *R. Demme*, Professor of Phar-

macology to the University of Bern.—*Dörrien*, Vorsitzender des Deutschen Pharmaceutenvereins in Berlin, N. Friedrichstr., 125.—Dr. *G. Dragendorff*, Professor of Pharmacognosy in Dorpat (Russia).—*W. Dymock*, M.D., in Bombay (India).—Dr. *A. Engler*, Professor of Botany and Director of the Botanical Gardens, Mitglied der Akademie der Wissenschaften in Berlin.—Dr. *L. Fischer*, Professor of Botany and Director of the Botanical Gardens in Bern. —Dr. *R. F. Fristedt*, Professor of Pharmacology to the Royal University in Upsala.—*Herm. Traug. Fritzsche* in Firma: Schimmel & Co. in Leipzig and Fritzsche Brothers in New York.—*M. Frœlich*, Vorsitzender des Deutschen Apotheker-Vereins in Berlin, N. Auguststr., 60.—Dr. *Aug. Garcke*, Professor of Botany in Berlin, Gneisenaustr, 20.—Dr. *E. Geissler*, Professor of Chemistry to the Thierarzneischule in Dresden.—Dr. *Giacosa*, Professor of Pharmacology and Physiological Chemistry to the University in Torino (Italy).—Dr. *Torquato Gigli*, Professore nella scuola tecnica in Pavia.—Dr. *Greshoff*, Chef van de 4te Afdeeling of the s'lands plantentuin in Buitenzorg (Java).—Dr. *Hilger*, Hofrath, Professor of Pharmacy and Practical Chemistry in Erlangen.—Dr. *Fr. Hoffmann*, in New York (U. S. A.), 183 Broadway.—Dr. *Th. Husemann*, Professor of Pharmacology and Toxicology in Göttingen.—Dr. *Kobert*, Professor of Pharmacology at the University of Dorpat.—Dr. *Lubolt*, Commerzienrath, in Firma: Gehe & Co., in Dresden. —*H. P. Madsen*, pharm. chemist in Kopenhagen.—*John M. Maisch*, Ph.M., Phar. D., Professor of Materia medica and Botany in the Philadelphia College of Pharmacy, in Philadelphia (U. S. A.)—*K. F. Mandelin*, in Wasa (Finnland).—Dr. *R. Marloth*, in Capetown (South Africa).—Dr. *J. Möller*, Professor of Pharmacology and Pharmacognosy to the University in Innsbruck.—*F. von Müller*, Government's botanist in Melbourne (Australia).—*Morten Nyegaard*, in Christiania.—Dr. *C. A. J. A. Oudemans*, Professor of Botany and Pharmacognosy to the University in Amsterdam.—Dr. *Peckolt*, in Rio de Janeiro (Brasils), Rua da quilanda. —*A. Petit*, Président de l'Association générale des Pharmaciens de France in Paris, 8 Rue Favard.—*Pfersdorff*, pharm. chemist in Strassburg i./Els.—Dr. *G. Planchon*, Directeur de l'École supérieure de Pharmacie à Paris, Membre de l'Académie de médicine, 4 Avenue de l'observatoire.—Dr. *Th. Poleck*, Geh. Regierungsrath, Professor to the University and Director des pharmaceutisch-chemischen Institutes in Breslau.—Dr. *F. B. Power*, Professor of Pharmacy and Materia Medica to the School of Pharmacy of the University of Wisconsin in Madison (U. S. A.)—Dr. *Th. Sandahl*, Professor of Materia Medica at the Kongl. Carolinska Institutet and Professor of Pharmacognosy to the Pharm. Institute in Stockholm.—*E. Schär*, Professor of Pharmacy and Vorstand der pharmaceut. Abtheilung des eidg. Polytechnikums in Zürich.—Dr. *E. Schmidt*, Professor of Chemistry and Direktor des pharmaceutisch-chemischen Institutes in Marburg i./H.—Dr. *Junichiro Shimoyama*, Professor of Pharmacy of the College of medicine of the Teikoku Daigaku (University) in Tokyo (Japan).—Dr. *Eduard R. Squibb*, 56 Doughty Street, Brooklyn, New York (U. S. A.)—Dr. *Lud. Stahre*, Prof. of Chemistry and Pharmacy to the Pharm. Institut in Stockholm.—*Stanford*, E. T. C., F. I. C., F. C. S., President of the British Pharmaceutical Conference, Glenwood, Dalmuir, Dumbartonshire.—Dr. *W. Stœder*, Professor of Pharmacy to the University in Amsterdam.—Dr. *H. Thoms*, Vorsitzender der Pharmaceut. Gesellschaft in Berlin, N. Neue Hochstr. 6.—Dr. *Wladimir Tichomirow*, Professor of Pharmacy and Pharma-

cognosy to the University in Moscow.—Dr. *Jul. Trapp*, Professor, kais. russ. Geheimrath, Excellenz, in St. Petersburg.—Dr. *A. Tschirch*, Professor of Pharmacognosy and Director des Pharmaceut. Institutes to the University of Bern (Switzerland).—Dr. *Aug. E. Vogl*, Hofrath, Professor of Pharmacology and Pharmacognosy to the University of Wien.—Dr. *J. E. de Vrij*, in Haag (Holland).—*A. von Waldheim*, Director des Oesterr. Apotheker-Vereins in Wien.—*Fr. Weber*, Präsident des Schweiz. Apotheker-Vereins in Zürich.—Dr. *Alb. Weller*, Director der Vereinigten Fabriken chem.-pharmac. Produkte Feuerbach-Stuttgart and Frankfurt a./M., Zimmer & Co., in Frankfurt a./M.—Dr. *J. Wiesner*, Professor of Anatomy and Phys. of plants to the University, Mitglied der Akademie der Wissenschaften in Wien.

Correction.—The article on page 99 of our last number on the "estimation of iodoform" was selected from *The Analyst*, 1892, page 7. Through an oversight, the concluding paragraphs were omitted, namely, a table of analytical results proving the correctness of the proposed method, and the following additional information:

The method does not take more than half an hour to perform, and is therefore practical. Should the iodoform be obtained in ethereal solution, as for instance, in the estimation of acetone, the ether need not be evaporated, but can be mixed directly with the alcoholic soda. No danger of loss of iodoform need be feared, and it is not necessary to use an inverted condenser.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Handbuch der Arzneimittellehre. Mit besonderer Rücksichtnahme auf die neuesten Pharmakopöen für Studirende und Aerzte bearbeitet von Dr. Theodor Husemann, Professor der Medicin an der Universität Göttingen. Dritte Auflage des Handbuches der gesammten Arzneimittellehre. Berlin. Verlag von Julius Springer. 1892. 8vo. Pp. 687.

Handbook of Materia Medica, with special reference to the latest pharmacopœias; for students and physicians. Price, bound, 10 marks.

Although the work before us is stated to be the third edition of the author's extensive medical work on materia medica, it may be viewed as a new work, written in a more condensed style so as to be adapted to the uses of the medical student, and at the same time be useful for consultation by practitioners of medicine. The scope of the work embraces, besides the remedies of the German pharmacopœia, also those dismissed by this authority, but still in use; as well as those of the recent Austrian pharmacopœia, and remedies of other countries possessing sufficient interest for the physician of central Europe. Naturally we may expect to find accounts also of those modern remedies, which of late years have been introduced in large number, and have been recommended as valuable, though, as the author remarks, many of these acquisitions to therapeutics will, after a brief renown, again become obsolete.

The book is divided into two parts, general and special materia medica, the former beginning with a chapter on the derivation and nature of remedies, then discussing pharmacodynamics in a general manner, and concluding with a more lengthy chapter on the art of prescribing medicines. This latter explains the manner of correctly formulating prescriptions, and then gives special descriptions and directions regarding the different forms of medication,

which are divided into four classes: solid, soft, liquid and gaseous forms. Under the first group are comprised species, powders, pills, plasters, soaps, suppositories, caustic pencils, etc.; the second embraces electuaries, jellies, poultices, pastes, and ointments; in the third are found the numerous forms of solution and mixtures for internal or external use, including liquores pulverisati (sprays); and the fourth group is formed of vapor baths, fumigations, gas baths and gaseous inhalations. These forms of medication are briefly characterized, their applications are explained, and the manner in which they may be prescribed by the physician is clearly indicated.

The second part of the work treating of special materia medica, considers the numerous remedies from the medical standpoint in sixteen classes according to their characteristic action; and these classes are arranged in the following four divisions: Prophylactics; topical remedies; pansomatics (aromatics, bitter remedies, antidyscratics, antipyretics), and teledynamics (neurotics, cardiotonics, dermatics, etc.) The drugs of each class are arranged according to their similarity of action. A brief history and a short but exact description of the drug or chemical, the chief active principle or principles of the vegetable or animal drugs, the behavior to solvents, etc., serve as an introduction to the most important part of the text which gives more in detail the medical action of the article, its therapeutic uses, doses, antidotes, etc., and closes with the galenical preparations into which the remedy enters, and when deemed necessary, with a few prescriptions serving as illustrations of the manner in which these remedies may be prescribed and combined with others.

It need scarcely be stated that important drugs are discussed with much greater minuteness than others of less importance, and that non-pharmacopœial drugs are, as a rule, merely briefly referred to. In all cases the important facts are clearly brought out in that convincing manner, which, owing to the exactness of the statements, is characteristic of the author's literary works. This attractiveness is enhanced by the pleasing garb in which this valuable and useful work is presented by the publisher.

Les Aristoloches. Étude de matière médicale, par Louis Planchon, Docteur en médecine, Pharmacien supérieur, etc., Montpellier: Hamelin Frères. 1891. 8vo. Pp. 266.

A very interesting and valuable monograph on the medicinal species of Aristolochia. In the first part, a brief history is given of the genus, followed by the description of its botanical characters, its geographical distribution and its medical properties. The second part treats of the drugs examined by the author, consisting of branches and subterraneous parts, and which he divides into three groups, viz: fibrous, of which A. Serpentaria and A. Clematitis furnish the types for short and elongated rhizomes; woody, the most numerous section embracing the guacos and mil-homens; and tuberous, which are again subdivided into three divisions: round (A. rotunda, pallida, etc.), long (A. longa, Fontanesi, etc.), and filipendulous (A. tenera and filipendulina). These drugs are considered and compared according to their physical and structural characteristics. The third part of the work is devoted to the special study of the medicinal species, nearly one-half of the two hundred known species of Aristolochia being considered, more or less extensively, according to their importance and uses. In each case a full list of synonyms is given, with refer-

ences to the literature and critical examination of the figures published by different authors; the history, habitat, admixtures and substitutions, chemical constituents and medical properties are described, with frequent references to the literature on these subjects. It seems somewhat strange that the author speaks of A. reticulata as "la fausse serpentaire;" but it is evident from the text that this term is used solely in distinction to the species yielding the drug originally introduced; for the fact is noted that, like the latter, it is officinal in the United States; also that it is almost exclusively met with in commerce, and that it is the only kind furnished by the wholesale druggists of France, while in that country the root of A. Serpentaria is met with only among the antiquated stock of old pharmacies, where it happens to be rarely used.

The critical care bestowed upon this monograph, which is evidenced upon every page, shows that with the author, who is director of the works on natural history in the école supérieure de pharmacie of Montpellier, it was a labor of love; and thus a very valuable work for the student of materia medica in general, and of pharmacognosy in special, has been produced.

OBITUARY.

Wilhelm Dankwortt died in Magdeburg, Germany, January 10, 1892, aged 70 years. He was born and educated in that city, and after serving there as apprentice and clerk, continued his studies at the University of Halle, where he passed the state's examination in 1848. In 1852 he became proprietor of a pharmacy in Magdeburg, and retired from active business pursuits in 1890. In 1863 he was elected one of the directors of the North German Apothecaries Society, and became its presiding officer in 1867 until 1872, when the union with the South German Association was effected. He took a very active part in the internal affairs of these Societies, both at the meetings and through communications to pharmaceutical papers; also in the elaboration of the German pharmacopœia, more particularly of its second edition which appeared in 1867. Other publications by the deceased dealt with the examination of flour, milk and certain paints, and the forensic detection of phosphorus. At the third International Pharmaceutical Congress, held at Vienna in 1869, Mr. Dankwortt was elected president. He was also connected with various pharmaceutical and other scientific bodies, as honorary or corresponding member; he was an honorary member of the Philadelphia College of Pharmacy.

Frank Frisby, Ph.G., died at Bismarck, N. Dak., January 18th, in his thirty-third year, of paresis. He learned the drug business at Atchison, Kan., studied at Ann Arbor, and then came to the Philadelphia College of Pharmacy, graduating in 1880, his thesis on Fucus vesiculosus being published in the same year in the Amer. Jour. of Pharmacy, p. 434. In 1883 he entered into business in Bismarck. When the Dakota pharmacy law was passed in 1887, he was appointed on the North Dakota Board and elected secretary. He also took much interest in the State Pharmaceutical Association, and contributed several papers to its proceedings. His widow and a little daughter survive him.

Charles P. Pengra, M.D., died in Boston, January 30th. He held the position of Professor of Materia Medica and Botany in the Massachusetts College of Pharmacy.